

AGRARIAN REFORM AND AGRICULTURAL
DEVELOPMENT IN MEXICO

BY

JUAN ANTONIO FIGUERAS

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Juan Antonio Figueras

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The objective of this study was to evaluate the Mexican agrarian reform in historical, economic, social, political and legal perspective.

During the Diaz regime, the hacienda became the typical feature of the countryside. The hacienda was a stagnant self-sufficient system that depended upon a plentiful labor supply.

The agrarian problem clearly became one of the main factors in the Revolutionary War. Land redistribution programs

were started for socio-political reasons, not for the purpose of establishing economically optimal agricultural units. Problems in the agricultural sector were approached pragmatically, as the ideological factors were broad and conflicting in some respects.

The main objective of the land reform program in the early years was the restitution of land to the Indian villages to promote political stability. The ejido was introduced to satisfy the social hunger for land, to keep land out of the market in order to prevent reconcentration of ownership, and to provide jobs for the ejidatarios' families. Initially, the ejidos received neither credit nor capital. Private farms were to provide the agricultural goods for the urban markets and for exports.

In 1934-40, President Cardenas, while placing most emphasis on the land redistribution program, added economic functions to the ejidos and initiated programs to provide credit. Between 1940 and 1958, the emphasis was shifted to irrigation and to providing security to the private sector. From 1958 to the present, political pressures again developed for re-emphasis on the agrarian program, but the major sources of growth in output were the expansions in irrigation and the development and distribution of complementary inputs, such as improved seeds, fertilizer, and pest and disease control programs. Growth in output and income was accompanied by a

reduction in year-to-year variability. The agricultural sector, especially since 1940, performed the basic functions expected of an agricultural sector in the development process.

The production activities of the ejidos and of the private land holdings are not subject to direct comparison on the basis of economic criteria alone. The two systems operated under different conditions and their objectives were different. The agrarian program aided in maintaining political stability. But agrarian reform has not, and cannot in the future, fulfill its promise of giving the land to those who work it, mainly due to the high rates of population growth.

The income and levels of living of the agricultural population have improved, pockets of deep poverty still exist, and average family incomes are below those in the other sectors. There is some indication that the degree of inequality in incomes has widened since 1940, after a reduction during the 1930's, but the share received by the top few appears to have been reduced. Social mobility, life expectancy and social security improved substantially.

With many imperfections, Mexico achieved the stability and the strong sense of national purpose needed in economic development. Mexico's agricultural problem today is basically a problem of over-abundance of labor on farms. Ejidos used less land and capital per worker than did the larger private

farms. Once the problem of absorbing additional population into the non-agricultural sectors is solved, the situation will be different. In the meantime, the ejido must continue fulfilling its social functions.

The Mexican experience in agrarian reform is not directly transferable to the other Latin American countries. The experience in Mexico was an autochthonous process with specific context in time and space. Consequently, it is not likely to be repeated nor would it necessarily be appropriate in other countries.

CHAPTER I

INTRODUCTION

Assessing the overall effects of a land reform program-- i.e., evaluating what the program has accomplished-- is not an easy task. One approach is to evaluate the program in terms of its motives and objectives. These motives and objectives may be vaguely defined. Therefore, they must be interpreted according to the social philosophy and the political and social conditions prevailing in the society [Warriner, 1969, p. xix]. Then, if there is a conflict among the multiple objectives, which should have priority [Gadgil, 1966, pp. 6-7]? The appropriate program must be determined on the basis of the specific situation in each country. As Warriner has pointed out, "The kind of society we should like to live in is not necessarily the kind of economy that will feed us best" [Warriner, 1964, p. 273].

The literature on the Mexican agrarian reform is abundant, particularly in Spanish. Classic works are those that deal with the geographical aspects of the land systems of Mexico [McBride, 1923] and those that explain the "why" of the ejido and its influence in the rural life of Mexico [Simpson, 1937, Whetten, 1948]; others concentrate on the application and effects of the agrarian reform in a specific

region [Senior, 1940; Aleman Aleman, 1966; Banco Nacional de Credito Ejidal, 1945], a specific period [Gomez, 1964], a specific aspect such as irrigation [Oribe Alba, 1960] or credit [Albornoz de la Escosura, 1966], a specific project [Poleman, 1964], or on the sociological change in a village due to the agrarian reform [Belshaw, 1967; Avila, 1969; Redfield, 1941].

Other works have concentrated more specifically on the historical, political and legal developments of agrarian reform and the Mexican revolution [Tannenbaum, 1929; Tannenbaum, 1950; Tannenbaum, 1966; Fabila, 1941]. On this aspect the most outstanding studies are two by Mexican authors--El Problema Agrario de Mexico [Mendieta y Nunez, 1964] in which the legal evolution of the agrarian reform is analyzed and El Agrarismo Mexicano y la Reforma Agraria, Exposicion y Critica [Silva Herzog, 1964]. These works expose the evolution of the political pronouncements with reference to the agrarian reform. Other works of Mexican authors are characterized by dogmatic emphasis on the preference of a specific system of land tenure [Duran, 1947] and are weighted heavily by the authors' subjective analysis of the agrarian reform [De la Pena, 1964]. Other works analyze only, and summarily, the economic aspect of the agrarian reform in the period since 1950 [Venezian and Gamble, 1969]. More recently, an econometric study of the factors of production responsible for the increase in

agricultural production of Mexico since 1940 has been published [Hertford, 1971]. Also, Singer has provided an analysis of the Mexican experience in terms of equality, with emphasis on income distribution and demand [Singer, 1969]. In addition, novels that deal with Mexican agricultural life have some relevance [Lewis, 1951; Lewis, 1964].

All the works mentioned are interesting and help in providing an understanding and evaluation of the effects of the agrarian reform in Mexico. However, they are limited by the fact that they are either outdated or deal too narrowly with specific elements. The objective of the present study is to overcome those limitations by analyzing the Mexican agrarian reform programs in their entirety and in connection with other matters related to economic and social development, especially as related to agriculture. The analysis was conducted from economic and socio-political viewpoints, with due consideration given to the specific historical, geographic, and legal conditions in which the developments took place.

In Chapter II, the general relationships between land reform and economic development are discussed. This background is necessary for understanding and evaluating the Mexican agrarian reform.

In Chapter III, the historical, geographical and demographical constraints that affected the Mexican agrarian problem at the beginning of the second decade of the 20th

century are analyzed. An understanding of these constraints is essential in analyzing the land reform program and its variations after 1915¹.

In Chapter IV, the Mexican agrarian reform program² after 1915 is analyzed in terms of its legislative manifestations, laws, and decrees of the executive power. How the legal base evolved is described, and consistencies and inconsistencies among the different laws and statutes, and among the objectives of the program, as well as the level of clarity and the ambiguities in their texts, are analyzed. Problems of implementation and politics are greatly inter-related with the legal manifestations of the land reform program.

Land reform, as far as it implies a redistribution of income, is inevitably a political question, involving conflicts of interest between the "rich" and the "poor". The poor could force the political powers to establish the legal framework of the land reform programs, but implementation is another matter. Ambiguity and inconsistency in the

¹In the 19th and early 20th centuries, the emphasis on land reform programs was in terms of equity and politics; at that time it was common to assume production techniques and possibilities were mainly a function of the land base, and the production techniques were considered to be uniform over large areas. See Ruttan, V.W., "Equity and Productivity Issues in Modern Agrarian Reform Legislation" mimeo., Dept. of Agr. Econ., Univ. of Minn. 1965, and cited by [Raup, 1967, p. 269].

²In languages derived from the Latin, as Spanish is, the terms "agrarian reform" and "land reform" are used interchangeably. These terms are also used interchangeably in the present study.

laws, as well as their feasibility in relation to the administrative capacity of the government to implement them, are considerations of the political powers of the rich in order to evade the regulations of the land reform program [Jacoby, 1966, pp. 21-22].

In the remaining chapters, evaluations of the effects of the land reform program and other development actions are presented. In Chapter V, the economic growth rates are measured and development is analyzed. Benefit-cost techniques are not sufficient measures as land reform is not a project that lends itself to simple economic calculation; it involves non-monetary results, and benefit-cost analysis over-simplifies the interconnection between cause and effect. In addition to the matter of factor ownership and productivity of the different factors at the farm level, there are other important matters such as the aggregate level of agricultural production, changes in technology and in quantity and quality of factors used, changes in the channels of supply of the factors and commercialization of the output, and changes in levels of employment and income and in personal income distribution. With respect to the levels of productivity, a proper perspective of their meaning is important. An increase in the productivity of one factor may be due to a better quality of the factor in question or to the increase in quantity or improvement in the quality of other factors, or even to the reduction in the quantity used

of the factor in question.

A further point with respect to an evaluation of the economic effects of any land reform program is that land reform implies a significant social change, with man as the center of attention. The level of complexity of the problems and the difficulty of identifying the effects of changes are directly correlated with the level of underdevelopment of the country [Carroll, 1963, p. 583]. This process of change in human society affects and is determined by the lives of individuals in that society, and it is difficult to separate the economic from the social aspects -- especially as they are intermingled among the objectives. Also, it is often difficult to express this social process by means of quantitative models. Georgescu-Roegen cited the thought expressed by Erwin Schorindinger that "...the difficulty of analyzing the process of life (with the use of mathematics) does not reside in the complication of mathematics, but in the fact that the process is too complicated for mathematics" [Georgescu-Roegen, 1966, p. 415]. For this type of problem, mathematics proves to be too simple and too rigid. Nevertheless, as far as possible, statistical analysis is used in the present study to analyze and evaluate the different facets and effects of the Mexican agrarian reform.

Another source of difficulty is the lack of readily

available and reliable data³. Mexico completed its first ejidal⁴ census in 1935, and every 10 years beginning in 1940 an agricultural⁵ and ejidal census has been taken. The most recent census was taken in 1960 and published in 1965. Thus, census data are available for only a few points in time. Time series data are quite limited, but cross-sectional analysis can be made for different regions of Mexico at a few points in time.

Uncertainty with regard to the accuracy of the data creates a serious problem. Agriculture is characterized by large numbers of producers of different outputs at different levels and using different combinations of inputs. This feature makes the collection of data very costly. Marco Antonio Duran, a professional Mexican economist, checked the agricultural and ejidal census of 1960 for internal consistency [Duran, 1968, pp. 259-268]. The lack of internal

³ "It is not exaggerated to say that in Mexico all that is related with the statistics...is in a deplorable state" [Mosk, 1951, p. 89]; "In a great scale, the Mexican statistics have been only approximations and guesses, informed ones, I hope" [Singer, 1969, p. 6]; "...in the building, processing and presentation of our official statistics, it prevails to a great extent the subjective judgements which contribute to imprint their seal of lack of veracity" [Martinez Escamila, 1968, p. 97].

⁴ Ejidal was a form of land tenure established by the Mexican land reform program, beginning in 1915, which has its roots in the Indian and Spanish traditions of Mexico. A detailed analysis and description of its origins and backgrounds are presented in subsequent chapters.

⁵ The word "agriculture" in English implies both crop and livestock production. But, in Spanish "agricola" refers to crop production and "ganadero" refers to livestock production.

consistency among certain data was so obvious that doubts are raised with regard to the reliability of the data that could not be checked. Duran points out, with respect to the agricultural and ejidal census of 1960, that for seven of the Mexican states the census area was greater than the total area of the respective states. The excess in those seven states amounted to almost 64,000 square km., an area equivalent to any one of the states of Nuevo Leon, Guerrero or San Luis Potosi [Duran, 1968, p. 259].

Duran also compared the data obtained from the agricultural and ejidal census of each decade with the data published annually and found large inconsistencies between these two sets of estimates that are published independently by different governmental organizations. With reference to the livestock statistics, the agency that published annual data calculated the cattle population for 1960 as 31 million head; whereas, the agricultural and ejidal census, based on preliminary data published in 1964, reported a cattle population in 1960 of only a little over 17.5 million head [Duran, 1968, p. 261]. Apparently there was a lack of coordination between the different agencies; also, the annual data reflect only a mechanical process of extrapolation, while the census data are given as reported by the farmers, without analysis, despite the tendency of farmers to under-report numbers of items [Duran, 1968, pp. 261-264]. Despite the problems described above, data taken from the agricul-

tural and ejidal censuses are used in the present study because these reports are the only sources of comprehensive data available. The limitations pointed out by Duran are taken into account in qualifications made when these data are used. Additional secondary sources, based on surveys of specific parts of the country, are used also.

In Chapter VI, the result of an analysis of agriculture's contribution to development is presented. The comparisons and contrasts of changes in the ejido and the private ownership units are presented in Chapter VII. Analyses of the social and political aspects of economic development and the land reform program are given in Chapter VIII. Although many economists bypass these aspects of land reform, the social and political aspects provide the framework within which the economic institutions operate and in turn influence the economic effects. The redistribution of land, when land is the main source of income and wealth, constitutes a "...social shock...[that]...sets forces in motion that tear at the roots of all forms of privileged status..." [Raup, 1967, p. 299], and changes the framework of expectations of all persons affected. Political considerations dominate land reform; it is not primarily motivated by a profit maximizing objective, nor is the aim to obtain the most efficient production level. It is mainly motivated in most cases by forces striving for a greater degree of equality in wealth and income, and to obtain a

greater sense of human dignity and personal freedom for the community affected [Raup, 1967, pp. 303-304]. Consequently, since politics is at the root of any reform program, when evaluating any of these programs one should keep in mind that the government undertaking them is affected by the relationships among the different political forces--both those supporting and those opposing the land reform programs--at any point in time. The government, as a result of the political process, has to deal not only with what it would like to do but what it can do. Politics has been called the art of the possible, and the "ideal" is not always politically feasible.

Myrdal [Myrdal, 1944, pp. 1027-1045] and Weber [Weber, 1949, pp. 50-113] have pointed to ways of dealing with the problem of biases and prejudices--problems of particular importance when one deals with social and political phenomena. Value judgments, bias and prejudices go with one always, but when these have been clearly expressed at the beginning⁶, one can deal more objectively and scientifically with the problem by distinguishing between the judgments of fact and the value judgments.

⁶The selection of this topic, agrarian reform, indicates an interest of the author in the subject. During his younger years, he observed in his country, Cuba, the direct relationship between the social status of a family and the area of land owned. This initial interest in the social aspect of the agrarian reform arose from these earlier observations. Studies at the university level have made him aware of the importance of the economic aspects.

In Chapter IX, a summary of results and conclusions is presented and the relevance of the Mexican experience is discussed with reference to the other countries of Latin America.

CHAPTER II

LAND REFORM AND ECONOMIC DEVELOPMENT

Philosophical Bases and Objectives

Land has exerted a decisive influence in the behavior of human societies. Where man discontinued a nomadic system and established permanent agricultural settlements, land shifted from an object of occupation only and became an object of appropriation also. The settled land was considered to be owned by the group that occupied it. At the same time, the group established rules that were to be followed in the use of the land [Mendieta y Nunez, 1961a, p. 27].

During that epoch, land defined as "the exposed part of the earth's surface" became also defined in economic terms as "...a natural resource [usable] as a factor of production" [Barnhart, 1969, p. 684]. While land that is considered as the space of the exposed part of the earth is fixed unless it is increased at the expense of the seas, land as a natural resource could be considered as limited or fixed with respect to a given technology in which case the exposed part of the earth would be considered as an ultimate limit.

Technology was not changed over relatively short periods of time; therefore, those who owned land had, as a group, the monopoly of its use as a factor of production.

The degree of substitution of other factors of production for land was limited by the level of technology that prevailed at the time. The more primitive the technology employed in its exploitation, the more indispensable was land as a factor of production, i.e., "...the lower a society stands in the ladder of economic development, the greater the relative importance of land as the prime resource" [Carroll, 1963, p. 583].

The possession of land then became an instrument and symbol of political and economic power and social prestige as well as a means of acquiring wealth by way of its use in agricultural production. A change in the way in which land is possessed results in a redistribution of land which involves an important social change [Warriner, 1964, p. 272]-- not only a change in the distribution of property rights but also in the system of interpersonal and intergroup relationships governing the application of labor and other factors of production to land. Thus, land tenure systems may be defined as the "...relationships among men...in the use of land and the distribution of its product..." [Barraclough, 1970, p. 216]. The tenure systems become institutionalized by law as well as by their continuous existence in the forms of custom and tradition. According to this definition of land tenure, land reform¹ implies the changing of the land tenure

¹Land reform has been a subject of discussion for many centuries; "land to the landless" was a slogan even in the times of the Roman Empire. See [Louis, 1938, pp. 494-495].

systems, of which redistribution of land property is an important and basic part affecting the tenure system.

Land tenure systems affect social attitudes and national tradition as well as economic aspects of land use and personal income distribution [Warriner, 1964, p. 273]. Consequently, land reform is not guided by economic considerations alone; it is based also on social and political considerations, and in final analysis it is developed in the political arena of clashing political ideologies, interest groups and political personalities.²

The philosophical justification for any government to undertake a land reform program is founded on the social character of property, land property included, as an institution. Early philosophers, such as Seneca and St. Ambrose, held the cosmological view that "...man must answer to the Creator for the use of the resources and elements entrusted to him" [Fals Borda, 1968, p. 176]. Proceeding along the same argument, "...indeed, one may ask why should land be placed in a different category from other natural elements such as water, air and light?" [Fals Borda, 1968, p. 176]. One answer to this question is that land is a scarce resource.

²"Land reform is perhaps first and foremost a political phenomena...its implementation requires a clear break with the past and the overwhelming of forces that at least at some point in the not too distant past carried considerable political weight" [Lyman and French, 1970, p. 40].

Other philosophers, such as John Locke, argued that land (a natural resource) has been given to all mankind in common "...God, as King David says (Psalm CXV. 16), 'has given the earth to the children of men, '..." [Locke, 1952, p. 16]. But this, according to Locke, does not negate the institution of private property "...every man has a 'property' in his own 'person'... The 'labour' of his body and the 'work' of his hands...are properly his. Whatsoever, then, he removes out of the state that Nature hath provided and left it in, he has mixed his labour with it, and joined to it something that is his own, and thereby makes it his property. It being by him removed from the common state Nature placed it in...excludes the common right of other men" [Locke, 1952, p. 17]. But this right of private property was not unlimited. Any person could own as much as he could enjoy, provided nothing was spoiled or destroyed. The adoption of money enlarged the horizons of the things obtained from the earth that any person could enjoy through their exchange for money before they spoiled or were destroyed. "...it is plain that the consent of men...have agreed to a disproportionate and unequal possession of the earth...they having, by a tacit and voluntary consent, found out a way how a man may fairly possess more land than he himself can use the product of, by receiving [money] in exchange..." [Locke, 1952, p. 29]. Still, Locke leaves the doors open for a land reform program "...if either the grass of his enclosure rotted on the ground,

or the fruit of his planting perished without gathering and laying up, this part of the earth, notwithstanding his enclosure, was still to be looked on as waste and might be the possession of any other" [Locke, 1952, p. 23]. Implicitly, Locke was condemning the latifundist who did not properly work his land; consequently, justifying the expropriation and redistribution of that land.

A more laical justification for land reform is based on the "eminent domain" of the State, which establishes the law for the collective benefits of the society under the protection of the State. Hence, when the ones who possess the land do not or cannot use it to promote the general welfare of society, but instead hold it as an obstacle to the progress of all society, the government as exponent of the State, has a right to expropriate the land for use in the public interest [Fals Borda, 1968, p. 177].

Each land reform program should be evaluated individually as each one is faced by different constraints, mainly of a geographical and historical character. In each country the land tenure systems are old and deeply interrelated with the economic and social systems. Also, each program will have different specific objectives. Nevertheless, some generalizations may be established. In general, the objective of all land reform programs may be said to be to enhance the human dignity of the rural population, and thus "...enabling [them] to make a greater contribution to the improvement of society"

[Inter-American Committee for Agricultural Development, 1962, p. 18]. Implicit in this general objective are the concepts of achieving "...the aim of greater social and economic equality" [Warriner, 1969, p. 13]. This general objective is expressed in relative terms and is aimed toward a greater degree of political stability, an increase in the level of agricultural production, and in Latin America, Warriner identifies two specific objectives in the abolition of feudalism, implying serfdom and the furthering of nationalism or emancipation from the legacy of the colonial powers, and abolition of estate ownership by foreigners [Warriner, 1969, pp. 7-11].

Many economists, particularly those who have been educated in developed countries of the West, have neglected the study of the relationship between land reform and development of the society. "They react towards it either as a subject that belongs somewhere in the prosaic underworld of farm management...and the applied agricultural sciences, or as a disturbing maneuver of demagogic or activist intent which anyway would not lend itself to formal analysis" [Flores, 1965, p. 21]. This attitude toward land reform may be related to the training in Classical, Neoclassical and Keynesian economic theory in which the institutional framework is given, while land reform, or redistribution of land property, implies the changing of the institutional framework. Thus, most of the land reform studies have been done by agricultural

economists, in many cases farm management oriented, whose training has been oriented toward the achievement of optimum allocation of resources within the farm and within the agricultural sector. Analysis of critical inter-sectoral shifts due to land reform have been neglected, and emphasis has been placed on increased efficiency with "...the primary objective...to maximize farm profits" from a given set of resources [Barracrough, 1970, p. 218]. "The concept of the individual profit maximizing farm-firm, which makes management, investment and marketing decisions in splendid isolation..." [Barracrough, 1970, p. 218], is such an intensive part of economists' training with respect to agriculture that most of the discussions about land reform have been centered only on the "kinds of farm units," on improving the size of the farm enterprise, or searching for the optimum size of a farm, without consideration that this is relatively meaningless if not analyzed within the specific social system in which the farm is operating. Farming is not an isolated event, it depends on its relationships with the other sectors, which depend in turn on the institutional system of the society. As stated by Carroll, "Over and beyond its role in [farm] production, tenure is also closely bound up with the political institutions in every country" [Carroll, 1963, p. 583]. The main effects of land reform are expected to occur in terms of economies of size and input productivity, incentives, distribution of

income and social and political status, and employment.

Economies of Size and Input Productivity

The effect of land reform on agricultural production usually is centered around the matters of the optimum farm size and optimum productivity for all the agricultural factors of production [Long, 1961, p. 113]. It is generally taken for granted, based on experience of the developed countries of the West and especially in the United States, that there is a high positive relationship between size of farm unit and agricultural income. "American studies...[generally] confirmed that larger farms normally have...higher operator incomes" [Long, 1961, p. 116]. The higher incomes and the larger units have been associated with a higher degree of efficiency. This relationship has been correct in the United States where labor was relatively scarce in relation to land and in recent times to capital as well.

In the underdeveloped countries, particularly Latin America, the case is quite different. Capital or land, if we mean specially land available to immediate use under the existing technology and the availability (forms and quantity) of capital, is more often the limiting factor. But this is not the whole picture, for several studies have indicated that yield, or output per unit of land, is inversely related to farm size [Dorner, Brown, Kanak, 1969, pp. 10-11]. Nevertheless, as Long mentioned with respect to India, what is

relevant is not the relationship of farm size and yield in a static sense, but relationship in a dynamic sense. Land reform is a dynamic process; therefore, what has to be analyzed is how size is related to the process of increasing productivity [Long, 1961, p. 119].

Another problem is which measure of productivity to use. Most economists agree that the most relevant measure is in terms of output with respect to the scarce factors. Where land is a scarce factor, it can be seen that land productivity varies widely even in the same region, or within the same area, depending on the quality of the soil, and the other factors used. Productivity will differ as it is analyzed with respect to different factors as a result of their different qualities and available quantities -- population density, methods of production, forms and quantity of capital are changed during the process of development.

As one looks deeper into the problem, in a world characterized by continuous change, meaningful discussion about the optimum farm size must be with reference "to what and to whom?" [Flores, 1965, p. 22]. "What" and "who" are continuously changing, therefore, in the strong words of Flores, "...talk about the optimum size...is nonsense..." [Flores, 1965, p.22], since any resource in itself is a dynamic concept. "A resource...is a highly relative concept changing with the ...planning agent, with his objective, with the level of technology and with existing social institutions" [Flores, 1965, p. 25].

In a similar fashion, Schultz has pointed out that "...the transformation of traditional agriculture always entails the introduction of one or more new agricultural factors, and therefore, it gives rise to a process in which the critical question is not one of scale but of factor proportionality" [Schultz, 1964, p. 111]. The scale effect is usually associated with changes in the forms of capital as the output varied.

The concept of relating size and productivity has its roots in the past and is held across opposite ideologies. It started with the Industrial Revolution in the 19th century and the mass production processes in industry under factory systems. But output in agriculture is not controlled by man to the extent that factory output is controlled, where production can be carried out on a continuous production line and is not often affected by weather, pests, etc. The idea that economies of scale are more limited in agriculture than in industry was pointed out by the early classical economists. In the 18th century, John Stuart Mill wrote "...the superiority of the large scale system in agriculture is by no means as clearly established as in manufacturing..." [Mill, 1936, p. 144].³

³On the same arguments, Nicholas Georgescu-Roegen points out: "...one may grow wheat in a pot or raise chickens in a tiny backyard, but no hobbyist can build an automobile with only the tools of his workshop. Why then should the optimum scale for agriculture be that of a giant open-air factory?" [Georgescu-Roegen, 1966, p. 363].

A major source of the economies of scale in industry is specialization of workers in specific tasks, while any marked degree of task specialization in agriculture would cause the workers to waste time in waiting from one operation to another. The operations of agriculture must be sequential; since we are dealing with living plants and animals, many tasks cannot be performed simultaneously as in a factory line of an industrial process-- "...as yet [we have] been unable to shorten the gestation period in animal husbandry or (to any significant degree) the period of maturity in plants" [Georgescu-Roegen, 1966, pp. 363-364]. Due to the specific characteristics of agriculture it is more difficult to manage a large farm than a large industry. This is due not only to the "...greater time and space dimensions of the production process in agriculture...", but to the greater need for on-the-spot specific decisions in adapting the process to the different characteristics of specific situations [Raup, 1967a, p. 251].

In agriculture, there are different economies of scale for different operations [Warriner, 1969, p. 40]. Most of the capital inputs in agriculture, those relevant for transforming traditional agriculture (e.g., improved seeds, fertilizers, pesticides, water, improved crop practices) "...involve no direct economies of scale and are suitable for use on both large and small farms..." [Bachman and Christensen, 1967, p. 248]. On the other hand, mechanization,

including tractor power, generally requires farms of large size (unless they are employed on a cooperative basis) for efficient use. In the underdeveloped countries, where labor is often the abundant factor, mechanization that involves labor saving would not be economical from the viewpoint of the economy as a whole.⁴

Incentives

The oldest and typical argument for land reform is the one with reference to the effect of land ownership upon the incentive to increase agricultural investment and production. This argument is dependent on the land tenure systems prevailing before the land reform takes place. In Latin America, the prevailing type of tenure system in many countries is or has been the hacienda system⁵, which is not conducive to the investment process in and out of agriculture. It encourages the maintenance of the status quo and a high level of conspicuous consumption of imported goods. Under the characteristics of serfdom that the peasants found themselves in, with their lack of security and incentives and opportunities for obtaining a better way of living by working more intensively, little improvement could be expected [Warriner, 1969, pp. 30-31].

⁴This view is discussed further in a later section where the specific effects of land reform on the employment levels are estimated.

⁵The hacienda system is defined and how it came into being is explained in Chapter III of the present study.

But it is not expected that the level of agricultural production will increase substantially as a result of the redistribution of the land alone. This action may establish the necessary incentives, and may create the possibility for farmers to obtain new supplies of capital. But these conditions will need to be established after land reform takes place, not instead of it, and as a consequence of it [Flores, 1965, p. 28].

Although changes to provide incentives to investment in the agricultural sector are important, substantial increases in investment are not expected to occur immediately. With the possible exception of large scale irrigation, most of the investment in agriculture is typically made in small quantities, neither concentrated in time nor in space. "The image of development conveyed by a hydroelectric dam or by a steel mill is misleading if applied to agriculture..." [Raup, 1967a, p. 273]. Accretionary processes are the typical means of increasing the stock of farm capital (i.e., fencing, water supply, land clearing, and buildings) and of improving and enlarging the livestock herds (i.e., improvements in quality and disease protection). Since the returns from these changes occur over long periods, the incentive provided by means of the security of the exclusive right to the use of these productive stocks is basic to their achievement. Once the peasants have achieved their minimum level of subsistence, they have a choice of what to do with additional goods,

income, and labor, when they have adequate tenure security.

Nevertheless, the new incentives to transform the excess family labor into capital formation activities may be of little value if implements with which to work are lacking. The security of tenure is also associated with the social overhead capital structure established by the public sector--i.e., the government--such as cadastral surveys and land title registry. These types of government capital formation are associated with the ability to obtain mortgaged credit [Raup, 1967, p. 279]. These forms of public capital formation, as well as other forms of social overhead capital needed for the development of agriculture (i.e., irrigation, local roads, accessible police, justice)⁶ will depend on the intensity of the desire, as well as the capability, of the public sector to provide them. This desire will depend upon the redistribution of political power accomplished by land reform--that is, on the opportunities available to the peasants to participate in the political processes at the local and national levels.

Income Distribution, Social and Political Status

Intimately related to the matter of incentives to increase investment and production is the effect of land

⁶"Large-scale educational programs in rural areas will be [another] form of capital accumulation" [Bowring, 1963, p. 306].

reform on the redistribution of wealth and income. In the underdeveloped countries, agriculture is the main sector; consequently, the main source of wealth is "...ownership of land...the basis for the prevailing standard of income distribution." The redistribution of the main rural source of employment and income implies a less skewed distribution of wealth and income in the post-land reform period [Flores, 1963, p. 243]. Associated with this effect is the assumption that agricultural production will grow faster than population and thus a nutritional improvement will occur as a result of the land reform and income redistribution [Doyring, 1970, p. 22].

This improvement would have social effects, as well as economic welfare effects, in terms of creating a sense of greater dignity and an expansion of social opportunities for the rural population.

The income elasticity of demand for basic consumer goods is expected to be higher for low income groups than for high income groups. A more equalitarian distribution of income would give a greater degree of purchasing power to a greater percentage of the population, and would create a wider domestic market for national industries that produce essential consumer goods. A more skewed distribution, as generally exists before land reform, means that a significant part of consumer demand is for luxury type goods by the small number of high income families--goods that are foreign produced and

purchased for luxury or conspicuous consumption. The more skewed income distribution does not imply a higher propensity to save and invest as the experience may have been in the early development stages of the present developed countries; "...in some of these [underdeveloped] countries...consumption propensities of upper-income groups are far higher and savings propensities far lower than were those of the more puritanical upper-income groups of the presently developed countries" [Kuznets, 1965, p. 216].

Immediate and full compensation for land expropriated in the land reform process would defeat the purposes of income redistribution. It would mean the exchange of one asset for another asset of equivalent value. "To claim that landlords should be fully compensated is as absurd as to expect that taxpayers of advanced countries should receive cash compensation...in an amount equal to their taxes" [Flores, 1965, pp. 30-31]. Besides, the existing prices of land are monopoly prices, therefore, there is no basis in economic terms for paying compensation. Also, much of the current value of land is due to population growth and to public investments rather than to private investments made by the owners. However, the compensation is likely to depend on political forces, thus the bargaining power of the conflicting political forces is likely to be the determining factor rather than the economic consequences.

The social and political effects of land reform can be

summarized as the creation of "...a sense of security and participation by peasants as a basis for political stability" [Long, 1961, p. 113]. As income is redistributed, a base is created for the government to become more responsive to the needs of the population in general rather than to an elite class. Educational opportunities, with their reinforcing effects on the economic progress of society, are more likely to become more readily available to the rural population [Dovring, 1970, p. 24].

This redistribution of land would help the political system to counter-balance the strain which the development process itself, through its widening of income inequality, is likely to generate in the society as savings are concentrated in the upper-income brackets and there is a shift away from agriculture toward urbanization [Kuznets, 1965, pp. 204-205].

Political stability has been generally accepted as prerequisite for economic development; security of receiving the expected rewards in the future for actions taken in the present is a requirement of the capital formation process. But when the land ownership pattern is so highly skewed, and the rural population lives in poverty, the peasants are a source of political instability. When these conditions are changed, at least partly, by land reform, and a land owning peasantry is established with a viable living for the peasant, the conditions essential for the stability of government are

enhanced [Huntington, 1968, p. 375]. In the Jeffersonian traditions, it has been asserted that "...the wide diffusion of rights in property is...almost synonymous with individual freedom and liberty" [Fitzgerald, 1963, p. 44].

The importance of political stability implies that emphasis should not be placed on growth alone, but must include distribution as well. In the words of Gaitskell, "...is the emphasis on growth rate alone right?...should there not also be attention to the misery rate, even if the growth rate is slower?...if misery is to be overcome, more must be done to improve conditions in rural areas. A major reason for land reform is that far too many have no sense of citizenship and a great sense of contrast in wealth. The political risk has to be weighed, or it may destroy the growth" [Gaitskell, 1968, p. 51].⁷

Employment

The effects on the level of employment are closely associated with the other two economic effects--agricultural production and income distribution--as well as with the social and political effects. One of the contributions that the

⁷Kuznets expressed a related thought as follows: "...how can either the institutional and political framework of the underdeveloped societies or the processes of economic growth and industrialization be modified to favor a sustained rise to higher levels of economic performance and yet avoid the totally simple remedy of an authoritarian regime that would use the population as cannon-fodder in the fight for economic achievement?" [Kuznets, 1965, p. 216].

agricultural sector is expected to make to the economy during the economic development process is to provide labor for the more rapid expansion of the other sectors of the economy, especially the industrial sector.⁸ But the rate at which labor can be moved from agriculture to the other sectors will depend on how fast the agricultural production grows, the rate at which labor-saving capital is adopted in agriculture, and the rate of increase in the demand for labor in the nonfarm sectors. Employment and income distribution effects have been neglected in most of the literature on economic development [Dorner and Felstehausen, 1970, p. 231].⁹ Generally it has been taken more or less for granted that the industrial sector, once the development process starts, is capable of absorbing any excess labor from agriculture. Large scale mechanization, that substitutes capital for labor, in agriculture will reduce employment; and since more capital and less labor is used,

⁸The most important contributions mentioned are to (1) provide food, fibers, and raw materials to the other sectors, (2) provide capital formation, (3) constitute a market for the goods being produced by the other sectors, and (4) obtain the needed foreign exchange for the development process. [Johnston and Mellor, 1961, pp. 566-593; Nicholls, 1964, pp. 11-44].

⁹Economic theory that specifically emphasizes the employment issue was developed by John M. Keynes but its assumptions are more consistent with conditions of unemployment in a developed economy--a monetized industrial economy in which the government's monetary and fiscal policies could influence aggregate demand and, through it, employment.

productivity of employed labor is increased. In many situations, individual farm entrepreneurs would find their incomes increased and their labor problems reduced since they would have to deal with a relatively smaller labor force. This approach would be economically sound from the microeconomic standpoint, but at the macro level it has been found that the growth in the non-farm sectors does not absorb all the displaced labor. Thus, the analysis of mechanization in agriculture should include problems at the macro as well as the micro level. The private mechanization cost at the farm level may be much lower than the public cost.

The industrial sector of low-income countries is based mainly on imported technology¹⁰ which stresses the forms of capital that were developed in economies where capital was less costly in relation to labor. According to Barraclough "...from 1950 to 1965, manufacturing in Latin America is estimated to have increased by 140 percent, while manufacturing employment grew only by 45 percent" [Barraclough, 1969, p. 3]. Consequently, the government in any densely populated agricultural sector should direct its resources toward

¹⁰ Latin American countries imported their technology mainly from the U.S., but the labor-absorptive capacity of the U.S. is significantly greater due to its rapid growth in the stock of capital. A lower rate of population growth in U.S. is also relevant to this point. "The additional labor demand [in the underdeveloped countries] created by industrialization is a function not only of the speed of industrial growth but of the low level from which it starts." [Myrdal, 1965, p. 895].

accomplishing both the expansion of employment and an increased agricultural production. A land reform program, that redistributes land to the peasants, can accomplish both objectives.

Population in relation to land is often measured in terms of the average number of persons per unit of land, where land is defined as the exposed part of the earth's surface. A more precise concept is required as a significant part of that exposed part of the earth's surface may not be suitable for use in agriculture under the present condition of technical knowledge and financial resources of the particular country. Overpopulation might be said to exist if output will not be reduced (or even increased) when part of the population is moved out of the agricultural sector. But this idea fails to express explicitly the time variable in production as the labor force could be working more or less hours with more or less time taken as leisure. Georgescu-Roegen states that "...visitors from the lands of plenty often point out reprovingly that the people of poor countries indulge in greater leisure than themselves. They seem to ignore the fact that in strictly overpopulated countries people have no choice" [Georgescu-Roegen, 1966, p. 387]. In an overpopulated economy leisure may be economically unwanted and therefore it may not be an economic item. In this type of economy, the substitution of capital for labor would increase unwanted leisure and thus would

diminish real national product. Additional employment of any factor whose marginal productivity is positive will tend to increase output, regardless of its price and despite the fact that it may decrease profits.

Laws that set minimum wages may set the price of labor above the value of its marginal productivity. In the long run, no rational manager, when striving for efficiency, will use labor beyond the point where the value of its marginal productivity is equal to the wage rate. But under a system for peasant land ownership, the peasant will have a free choice for allocating his time among all farm production activities and between all these alternatives and leisure. In this way it is likely that land reform would provide encouragement for additional work and in turn would result in greater output. This point is of special significance when the family labor does not have an opportunity for alternative employment in any other sector.

In many areas of the underdeveloped countries, human labor is abundant and in such circumstances land reform would be a means of encouraging additional work in agriculture without reducing employment in other sectors. "In the shorter run, the waste of capital-forming potential represented by under-utilized labor...[indicates that] drastic land distribution programs may also be good economics" [Raup, 1967, p. 275]. In addition it may be good economics to maintain labor in agriculture even when the value of marginal produc-

tivity is zero. Social problems may be reduced and self-esteem of the excess peasant population may be encouraged. This excess labor is able to establish a claim to a share in output, even if this has been due to what could be called "splitting the job," and everyone could feel a sound claim to a share of the output. If this opportunity were to be negated to these peasants, their only alternative would be to go to the city slums and, "...inefficient farmers may be better off where they are than if they were to head for the city's slums and welfare rolls.... To achieve a healthier agriculture at the expense of a sicker urban society is hardly a commendable objective" [Higbee, 1963, p. 105]. Involuntary unemployment in the cities is believed to be even more politically explosive than involuntary employment in rural areas.

CHAPTER III

MEXICO'S AGRARIAN PROBLEMS BEFORE THE 1910 REVOLUTION

The beasts disseminated...[throughout the country and] have their caves and grottos where to seek refuge, and the ones who fought and spilled their blood for the defense...[of the country] do not possess but the light and the air that they breathe... The generals deceived them when they exhorted them to fight for their tombs and their temples. They fight and die for the opulence of the others...and is not theirs the most insignificant plot.

Tiberius Gracchus

In this chapter the historical, geographical and demographical factors affecting Mexico's land reform that was initiated in 1915 are analyzed.

Pre-Colombian Era¹

Prior to the Spanish conquest, Mexico was inhabited mainly by two groups of people, the Aztecs and the Mayas. The Aztecs had established themselves in the central part of Mexico, the Mayas were located on the Yucatan peninsula. The Aztecs had a unique land tenure system at the time of the Spanish conquest. The king was the absolute owner of

¹A more detailed description of this period may be found in English in [McBride, 1923]; and in Spanish in [Silva Herzog, 1964], and [Mendieta y Nunez, 1964].

all the territories controlled by his army, but he distributed the lands according to the function exercised by his subordinates. Part of the land was kept by the king for himself (Tlatococalli); part of the land was given by the king to the nobles or aristocrats (Pillalli), to the warriors (Mitlchimalli), and part was set aside to take care of the expenses of the religious temples and ceremonies (Teotlalpan) [Silva Herzog, 1964, p. 13]. This last set of lands was cultivated by peons (Macehuales or squatters) or Mayeques.

The Aztec king had the right to dispose of the lands as he desired, but when he distributed the land, he usually imposed certain limitations. Generally, limitations imposed upon the lands allocated to warriors and nobles were that they could not be sold to the non-aristocrats, and if their families were extinguished, the lands were to be returned to the crown [Mendieta y Nunez, 1964, p. 5].

The king not only assigned lands to different persons according to their functions, but he also distributed lands to the different villages as social entities. The "barrios" or villages were called "calpulli," and the land assigned to each "barrio" was the "calpulalli," which was divided for its cultivation among the different families of the village, but the property rights belonged to the village--to the "calpulli"--as a collective unit. The families who received part of the calpulalli in usufruct--the "tlatlmilli"-- did

so under the condition that they would work it directly and continuously. If they did not cultivate the land in any two consecutive years, they lost the right of usufruct to the land. The size of these individual plots of land allocated in usufruct to individual families depended not only on the availability and productivity of the land, but also on the number of families in the village. "It is believed that the average holdings amounted to about two or three hectares" [Foreman, 1950, p. 65].

The parcels of land located outside the villages were the "altepetlalli," which in contrast to the "calpulalli" were not only held as communal property but were used in common also. These lands were used in common for hunting and wood cutting as well as for production to pay the public expenses of the villages. Neither the lands comprising the "calpulalli" nor the lands of the "altepetlalli" could be alienated [Heredia Carretero, 1961, p. 8].

The land tenure system under the Mayas in the Yucatan peninsula was different. "Due to the quality of the soil, the Mayas did not know [the system of] private property of the land..." [Silva Herzog, 1964, p. 15], not even in reference to usufruct. The property and usufruct of the land was communal. The poor quality of the soil forced them to migrate within the peninsula every fourth or fifth year.

Land Tenure System During the Colonial Period

The Spanish conquest shifted the possession of land in Mexico from the Aztecs and Mayas to the Spanish Crown. "Jus occupatio" was the base for taking the land from the Indians. The shift in possession was accomplished by force and was justified legally, involving then a shift in property, by the Bull "Noverint Universi" of Pope Alexander VI issued May 4, 1493. In this document, the Pope expressed: "To... King Fernando...and Queen Isabel...Catholic Kings...[who had undertaken]...to look and find some remote islands and continents...in order to reduce their natural inhabitants... to the service of our Redentor [Jesus Christ]..." [Cossio, 1918, pp. 3-7]. Thus, the Spanish Monarchs were to be granted claims on all the islands and continents discovered and that "...might be discovered west of the imaginary line in the Atlantic Ocean" [Foreman, 1950, p. 66]. Basically, the Pope's justification was that the earth belonged to God, and He as God's representative on earth, had the right to distribute it to those who by being Catholic might subdue and convert the native inhabitants of the newly discovered countries to the Catholic religion.

The activities of conquest were costly in men and funds. Some of these activities were supported by the Spanish Crown; others were supported with funds of particular individuals, who obviously expected to be rewarded later by the Spanish Crown. The Catholic Kings rewarded them in the form of

"encomiendas."² Indians were given to the conquistadors, with the legal justification that they were to be instructed in the Catholic religion by the conquistadors. The Indians were to repay the conquistadors by working on the land given to the conquistadors by the King as "mercedes reales de tierras" (royal gifts of lands).

The "mercedes" ranged in area from one "peonia" given to lower ranking soldiers, to a "caballeria"³ given to the soldier who rode a horse. The higher the rank, the larger was the number of "caballerias" included in the "merced." The "mercedes" were given initially to the conquistadors in reward for their services, but later they were used by the Spanish Government as donations to stimulate the Spanish colonization and settlement of the newly conquered lands.

The seeds of the latifundist⁴ system were being planted at this time with the Spanish Crown's "mercedes reales." In general, these properties were later converted into a "mayorazgo" (an entailed state) by means of which the oldest

²The right to the use of the "encomienda" initially was intended to last until the death of the "encomendero"--the one who received the encomienda--but through a succession of Royal decrees, it was extended not only to the second, but even up to the fifth generation; therefore "...[it] came to be regarded as private property..." [Foreman, 1950, p. 67].

³One "caballeria" is equivalent to 42 hectares and one "peonia" is equivalent to one fifth of a "caballeria," or approximately 8.4 hectares.

⁴The largest "mercedes real" granted was the one given to Hernan Cortes, the Conquistador of Mexico. Cortes was given an area of 25,000 square miles of land, which included the valleys of Oaxaca, Cuernavaca, Toluca, and a total of 18 towns and 23,000 Indians [Cossio, 1918, pp. 8-12].

son was to inherit the whole estate intact [Chevalier, 1956, p. 234]. These "mercedes" initially involved land taken from the Indian kings, warriors and aristocrats, as well as the land that these persons had assigned to support war and religious expenses.

The Spanish laws established and regulated four types of communal property systems among the Indian population of Mexico. These were the "fundo legal," the "ejidos," the "propios" and the "tierras" (lands) of "repartimiento." These types differ according to origin and purpose, but there is one thing in common among these four types of property systems and with the old Indian forms of land tenure, i.e., the "calpullali" and the "alteptlati." The common element is that land was held as public property, the property of the group as a whole or of the town as a social entity, and was not held by any individual person. The Spaniards considered the Indians as incapable of handling their own affairs, due to the "inferiority" of their culture. Consequently, even in cases in which Indians held private property, they could not alienate it without the consent of the Spanish authorities, and it was necessary that they show due cause for the necessity and convenience of alienating it [Mendieta y Nunez, 1964, pp. 53-67].

The "fundo legal" was land assigned to newly founded towns or villages. It consisted of a circle measured from the

church of the town, with a radius of 600 "varas."⁵ This land was allocated in small parcels to Indian families, where they would build their houses. The Spanish ejido was established by the Spanish King Don Felipe II in 1573 to provide the Indian villages with an extension of one "legua" on which to pasture their cattle, without getting them mixed with the Spaniards' herds.⁶ These tracts of land were to be used in common. The ejido, recognized by the Spanish authorities in Mexico, was thus similar to the "altepatlalli" of the Aztecs.

The "propios" were the public lands of the towns, assigned by the town authorities for use to pay specific expenses of the community. The "tierras de repartimiento" were the "calpulalli" of the Aztecs, recognized by the Spanish administration. They were tracts of land of communal property assigned to each head of a family for his individual cultivation and usufruct.

Despite the legal protection that was supposed to be provided by the Spanish laws, the partial or total disruption of the communal property lands of the Indian villages was a fact during the Spanish Regime.

During the pre-Colombian era, land was transmitted from

⁵One "vara" is about 2.8 feet.

⁶The word ejido is derived, as most of the Spanish words are, from the Latin language and means to exist outside the town. It came from the Latin word "exitus" which means exit.

one generation of Indians to the next without any formal evidence of title. This transfer was to work to the disadvantage of the Indian population of Mexico, particularly in the last century of Spanish domination. In the 18th century, the Spanish treasury was in a difficult situation; consequently, as a means of obtaining funds the Crown's Royal Order of October 15, 1754, required the persons or entities in possession of land in the new continent ("Las Indias"), but who did not have a clear title to them, to pay certain amounts of money "in proportion to the extension and quality of the land possessed in that way" [Mendieta y Nunez, 1964, p. 70]. These payments were called "composiciones" (mending arrangements) with the crown.

In most of the instances, by way of "composiciones," many Spaniards obtained title to land held through previous generations by the Indians. These Indians were at a disadvantage due to their lack of knowledge not only of the Spaniards' legal system and practices, but also to a lack of knowledge of the Spanish language [Foreman, 1950, p. 68].

The continuous loss of land by the Indian villages to the Spaniards and the "criollos"⁷ and the continuous deterioration of the standard of living of the Indians has been considered as one of the reasons why the Indians joined in the forces of independence, and fought against Spain.

⁷Criollos were people of Spanish parents born in the colonies in the Americas.

The Indians did not care about Fernando VII and the European political problems of the era--the conquest of Spain by Napoleon--which precipitated the wars of independence in the Spanish colonies. They cared about their own situation, for which they blamed the Spaniards and Spain.

Agrarian Problems from Independence to the
Start of the Mexican Revolution

Mendieta y Nunez [Mendieta y Nunez, 1964, p. 89] characterizes the agrarian situation after independence in terms of two main features: (1) deficient land distribution, with the Indian towns lacking enough land to support their respective populations and completely surrounded by latifundios belonging to individual persons and to the Church; and (2) deficient distribution of the inhabitants within the national territory.⁸

The system of "encomienda" prevailing in the colonial period, with the passing of time, was transformed into the Mexican type of latifundio--the hacienda. During the same period the Church, whose initial members in Mexico landed in 1524 in complete poverty with no possessions other than their clothes and the cross of Christ, was transformed into one of the main, if not the main, landowners in Mexico. The political power of the Church and of the latifundistas was so strong at the time of independence, that the early governments of Mexico

⁸A more detailed analysis of this point is given in subsequent sections where the geographical and demographical factors influencing the Mexican land problem are discussed.

did not dare to challenge them. Therefore, these governments attempted to deal only with the second aspect of the agrarian problem mentioned above. They acted as though the solution to the problem was a more uniform distribution of the Mexican inhabitants over the land and the immigration of European population to exploit the natural resources of the Mexican soil.

From the first independent government of Mexico, the government of Iturbide, to the last government of Santa Anna, the Mexican government passed several colonization laws for the purpose of bringing into cultivation vast areas of uncultivated land. In practice and in general, these laws did not have any positive effect as they did not attract any significant number of European settlers nor did they result in a redistribution of the Indian population. The laws ignored the real facts: these laws were not known by the Indian villages--most of the Indians did not know how to read or write Spanish--and the laws ignored the idiosyncrasy of the Mexican Indian "...live and die in misery but in his own town... The Indian of independent Mexico is characterized by his apathy and by being rooted in the land where he has been born, what was needed was to improve him in his environment, not...to draw him out abruptly" [Mendieta y Nunez, 1964, p. 96].

During the early years of Mexican independence, the property of the Church increased. Many landowners passed away without family inheritance. Many others, in the moment or

near the moment of death, trying to show repentance for their human sins, donated to the Church huge amounts of their property. Also, some other land properties were taken by the Church in lieu of unpaid mortgages. Once a real estate property had passed into the hands of the Church⁹, this was an irreversible process, almost never did the Church offer these properties for sale. For this reason these properties were called "bienes de manos muertas" (properties of dead hands); these lands were not used most economically and were taken away from the market as well.

The lack of funds in the public treasury of Mexico, the responsibility for paying foreign debts, the political situation that forced the resignation of President Santa Anna, to whom the Church had been an ally, brought up a new movement in Mexico called "La Reforma" (the reform).

This La Reforma movement was linked to the agrarian situation of Mexico basically by its Law of Desamortization of June 25, 1856. The political leaders of Mexico knew very well that a religion is a matter of faith and therefore is attached to each individual conscience. Consequently, they took all possible care to avoid creating any religious problem with the law of 1856. This law dealt with the Church only as a political institution and in purely economic matters.

In the Law of Desamortization of 1856 the first article

⁹Lands held by the Church were free of government taxes.

specified that "all the rural and urban properties that today have as owners the civil or ecclesiastic corporations of the Republic, will be adjudicated in property to the one who has them leased by the value corresponding to the rent being paid presently, calculated at a 6 percent annual interest" [Silva Herzog, 1964, p. 85]. Excepted from the law were the buildings dedicated exclusively to the specific service or purpose of the corporations. Also this law established a period of three months for the adjudications to take place, and if these were not completed within this period, the lessee lost his rights and the property could be denounced by any person according to the law, and sold in public auction, in which case the denouncer would receive one-eighth of the selling price. The government collected a tax of 5 percent in every transaction of estate property.

The purpose of this law¹⁰ was to create a country of private property landowners and, at the same time, to provide fiscal means of increasing public funds. The law affected not only the land held by the ecclesiastic corporations (the

¹⁰The basic stipulations of the law were incorporated later in the Constitution of 1857. This Constitution was reestablished after the Mexicans successfully, under the leadership of Benito Juarez, defeated in 1867 the French Emperor's attempt to establish Maximilian of Austria as head of the Mexican government. Benito Juarez and his intellectual supporters' ideas reflected the economic thought prevailing at that time in the United States and England: individual private property of land as a source of economic development as well as a source for establishing a Jeffersonian type of democracy [Whetten, 1948, p. 85].

Church), but also the land held by civilian corporations, which included the lands held by the communal Indian villages.

The results of the law differed substantially from what it was intended to accomplish. Many of the lessees, Catholic believers, did not take advantage of the right given to them by law, because they were facing the risk of excommunication by the Church; in addition, they would have had to pay the alcabala and the adjudication expenses. Many of the denouncers saw this matter from another viewpoint--first, to obtain the properties, and then with the wealth obtained, to try to change the attitude of the Church toward them. On many occasions, they bought a whole property, not a fraction of it, and thus latifundism was encouraged.

The people in the communal villages saw their lands being divided into private properties or, in the best of the situations, being transferred into private property by its former owners.

The Constitution of 1857 reaffirmed the stipulation of the Reform Law of 1856 that prohibited civil and religious corporations from owning real property except for the specific purposes of their existence.

The Laws of Disamortization were not rigidly enforced, but as a consequence of them the agrarian property which was previously divided among the Church, large landowners, and the communal villages, now, after abolishing the Church property and dividing the communal villages properties, the

latifundist system was extended and along the side were small property landholdings in the hands of the Indian population [Mendieta y Nunez, 1964, p. 116].

In 1876 General Porfirio Diaz became the president of Mexico and he was to dominate Mexican politics until he was deposed by the Mexican Revolution of 1910. Diaz' economic policy was to keep political stability in the country by the use of dictatorial powers and to encourage an inflow of foreign capital and skills in order to develop the railroad and mining industries. His idea was that these actions would aid in bringing unoccupied lands into production [Vernon, 1963, pp. 38-39].

Consistent with this economic policy, the Colonization Laws of 1875 and 1883¹¹ were passed. These laws authorized the government to enter into contract agreements with colonization companies. In return for subsidies in the form of franchises and public lands given to immigrating European families, these colonization companies were to colonize part of the "terrenos baldios" (uncultivated public lands). At the same time, the Mexican Government contracted with "compañias deslindadoras" or private surveying companies to survey the public lands for the purpose of colonization. In

¹¹Some historians have supported the idea that these legislative acts were sought mainly by speculators [McBride, 1923, p. 73].

exchange for their services, these companies were granted one-third of the surveyed land¹², plus the option of buying the other two-thirds at low prices. But the main problem of the law was that in order for the landowner to avoid having his lands considered as "baldios," he was required to present a title to the land, and in some cases he had to take his case to court, which was a time consuming and expensive process--a matter for which the small landowner usually lacked the necessary funds and the knowledge [Mendieta y Nunez, 1964, pp. 123-130]. Thus these Colonization Laws contributed to the expansion of the latifundist system in Mexico. Not only were small landowners stripped of their property, but a small number of persons acquired the lands disposed of by the "compañias deslindadoras" and those lands sold by the government after they were surveyed.¹³

In 1894, a Law of "Terrenos Baldios" with respect to the public lands of the nation was passed by the Diaz government. This law was closely associated with the previous colonization laws. It was in accord with the Diaz economic policy and objectives of attracting foreign settlers to work

¹³In addition, Silva Herzog points out that by 1889 the "compañias deslindadoras" had received 15 additional million hectares at a very low price. "...until 1889 these companies [compañias deslindadoras] were formed by only 29 persons, all rich and of great ascendance among the high official spheres" [Silva Herzog, 1964, p. 116].

the land with their more advanced cultivation methods¹⁴ with the emphasis on individualism and private enterprise as the keys to economic development. The emphasis on foreign settlers was a result of the fact that the power structure in the Mexican society had a profound disdain for the native Mexican population--they were considered the hindrance to the progress of Mexico, and it was thought that foreigners would bring civilization and progress [Tannenbaum, 1966, p. 195].

The Law of Baldios of 1894 divided the lands pertaining to the nation into "baldios," "demasias," "excedencias," and "nacionales." "Baldios" were defined in the second article of the law to be "The land of the Republic which has not been destined to a public use, by the duly empowered authority to do so by the Law, nor ceded by the same under onerous or lucrative title, to any individual or corporation authorized to acquire them."¹⁵

In the remaining articles, the law established the right of any inhabitant of the Republic to denounce "baldios,"

¹⁴In this respect, Silva Herzog points out that the Mexican government had not made a complete study of the geography of Mexico, "What was happening was that for being engaged in internal wars and having suffered aggressions of two foreign powers, the great majority of the Mexicans have not had the time to study and know our geographical reality" [Silva Herzog, 1964, p. 112].

¹⁵"Demasias" was land in excess of the area stipulated in the title, but within the boundaries established. "Excedencias" was land beyond the boundaries established by the title. "Nacionales" was land officially surveyed by the government or its agents--the "compañias deslindadoras"--but not legally alienated [Fabila, 1941, pp. 183-184].

"demasias," and "excedencias." Article 7 abolished any obligation, imposed by the previous laws on the owners and possessors of baldios, to have them populated and cultivated. Finally, Article 8 abolished the prohibition, imposed on the "compañias deslindadoras" (private surveying companies) by the Law of 1883, of selling the land obtained by their activities on lots greater than 2,500 hectares [Fabila, 1941, p. 183]. In summary, what the Law of 1894 did was to extend the individualistic ideas of Díaz, by giving to the property owners ("compañias deslindadoras") all types of guarantees and by abolishing all types of restrictions imposed by previous legislation, which, in fact, had been violated in practice [Fabila, 1941, pp. 186-187].

As McBride pointed out, the immediate effect of the law was wholesale grabbing by the land surveying companies and government officials as anyone could legally file a claim on a baldio. The possessor, if any, was the one who had to prove that he was the legal owner [McBride, 1923, p. 74].

During this period, the Indian landholding villages were continuously losing their lands through denunciation of their property for which they had no legal title, as the 1857 Constitution prohibited civil corporations--Indian villages were included in this interpretation--from holding property. The few Indian villages that survived had done so by transferring their lands to a trusted village elder, and thereby evading the Laws of Desamortization [Whetten, 1948, p. 86].

Also the Church had lost all its properties. While these changes were taking place, the latifundist system was becoming more deeply immersed in the Mexican agrarian structure in the form of the Latin American hacienda.

The hacienda was the typical and prevailing Mexican agrarian institution at the end of the Diaz regime, i.e., the beginning of the second decade of the 20th century.¹⁶ The hacienda system was not only an economic but also a socio-political institution. Generally, it was inherited, not purchased, by the landlord and was essentially a transplant of the feudalistic system that prevailed in Spain at the time of the conquest. It included large tracts of land, part of which was usually suitable for agricultural purposes, i.e., crops and pastures. The remainder was used to provide the complementary resources of water, wood, and cheap Indian labor. The landlord of the hacienda used whatever means he deemed necessary to control all these vital resources that were necessary for the subsistence and operations within the hacienda.¹⁷ The territorial extension embraced several Indian villages. Cheap labor was obtained by the landlord of the hacienda from these villages. The Indian agricultural workers were classified, according to the period of time they worked

¹⁶For a discussion of the hacienda system, see in Spanish [Manzanilla Schaffer, 1964, pp. 27-33]; in English [Whetten, 1948; Tannenbaum, 1966, pp. 187-198; Tannenbaum, 1950, p. 143].

¹⁷A hacienda included not only its own specialized artisans, such as blacksmiths and carpenters, but also had its own jails.

during the year, into "peones de tarea" (those who were contracted to do a specific job during a specific period of time) and "peones de ano o acasillados" (those who were hired to work the whole year in the hacienda). The latter class brought their families to live within the haciendas.

The agricultural laborer's life, i.e., the peon's life, was tied to the hacienda system from his birth in the hacienda to his death. All his life was under the paternal-master type of influence and control of the landlord. He could not leave the hacienda. Not only did he have no other place to go, but before leaving he was required to pay all debts to the landlord, his own as well as those that he had inherited from his father.¹⁸

The hacienda system was self-sufficient and money wages seldom were paid. The peons were given, instead of wages, a small piece of land called "pigujal" to farm on their own, after having fulfilled their daily "sun to sun" duties on the hacienda. For their clothes and other necessities, an entry was made in his name in the accounts of the company store ("tienda de raya") of the hacienda where he had to make all his purchases. Since their needs were greater than the value of earnings credited to them in the books of the store, they were always in debt to their landlord. Thus the peons,

¹⁸ "And if [that] economic coercion...and moral coercion of the priest was not sufficient to keep the peon in obedience, then there was the jail of the landlord and the corporal punishment to subdue them; there was the immense power of the property owner to send the rebel to engross the lines of the forced porfirista army" [Silva Herzog, 1964, p. 134].

their families, and their descendants were always tied to the hacienda system.

The typical landlord was an absentee, more concerned with his social status as a hacienda owner than with the productivity of his hacienda. His main concern was that of obtaining a yearly income from the hacienda which would enable him to satisfy his luxurious, usually foreign, consumption. His concern was not with unrestrained maximizing profits nor with increasing productivity by means of innovations.

The hacienda was directed by a hired administrator whose main concern was to obtain the minimum guaranteed income for his boss. He was not encouraged to increase the productivity, nor was he encouraged to innovate which will always involve some risks and problems in application and understanding not only by the traditionally bound peons but also by the landlord. The method of cultivation was extensive; half of the land was fallowed each year, and the inputs on cultivated lands consisted of some seeds, Egyptian plows and oxen, and labor.

Thus the hacienda as an economic system was stagnant. Its main concern was maintaining the status quo. At the same time, the hacienda was given a competitive advantage over the small landowner, its workers were in a condition of semi-slavery, money wages were not paid and the hacienda generally

paid little taxes.¹⁹ The small landowner obviously was at a complete disadvantage in the market.

All the other branches of economic activity in Mexico expanded during the Diaz regime, Mexico's GNP per capita increased 23 percent between 1900 and 1910 [Vernon, 1963, pp. 39-47], but the hacienda system kept the majority of the rural population deeply in debt and in semi-slavery. Nine thousand miles of railroad were built, foreign capital was poured into Mexico's plantations in the north under foreign control and increased the production of sugar, coffee, henequen, and cotton. The value of Mexican foreign trade increased continuously and rapidly [Beals, 1932, p. 371] but "...the Mexican agricultural laborers existed, during the Diaz regime, in a condition of sullen and brutish misery probably unmatched by the proletariat of any other country" [Parkes, 1938, p. 307].

Silva Herzog reported initially in an article published in 1925 [Silva Herzog, 1964, p. 127] that the salaries of the Mexican peons remained constant from the beginning of the

¹⁹Very little or no taxes were paid, due to their political influence. Due to lack of enforcement, they always paid less taxes than they should have paid according to the fiscal laws. Generally, they avoided these by having their haciendas evaluated at an insignificant part of their real value. Molina Henriquez cited three specific cases of haciendas in the state of Mexico: (a) real value of 6 million pesos, reported value 360,000 pesos; (b) 2 million pesos, reported value 412,000 pesos, and (c) 1.5 million pesos, reported value 380,000 pesos [Molina Henriquez, 1909, p. 95].

19th century through the last year of the Diaz regime in 1910 --a period of 100 years of Mexican Independence. These conditions were due to the economic laws of supply and demand within the institutional system. The number of Indians who lost their land properties, as the result of the reform and colonization laws, increased the number of peons seeking employment more rapidly than the demand for their services was increasing. While money wages of the Indians remained low, their real wages decreased up to the beginning of the 20th century as basic food prices increased. Peasants' salaries in the majority of the haciendas fluctuated between 18 and 30 Mexican cents per day.²⁰

Statistics of the Diaz epoch also indicated that 80 percent of the population consisted of rural laborers and 97 percent of the rural heads of families did not own a piece of land.²¹ At the same time, the hacienda system contained the greatest part of the arable lands of Mexico. An idea of the area included in an hacienda is indicated by the data given in Table 1. The haciendas reported in the Public Registry of Property in Mexico contained an average

²⁰The price of corn increased more than 150 percent between 1792 and 1908, based on data reported by Toribio Obregon, La Influencia de Espana y de los Estados Unidos Sobre Mexico [Silva Herzog, 1964, p. 127]. Gruening, reported that during the first decade of the 20th century, the Indian agricultural laborers purchasing power in terms of corn, their basic diet, was reduced more than 75 percent [Gruening, 1929].

²¹Direccion General de Estadistica, Estadisticas Sociales del Porfiriato (1877-1910) (Mexico, D.F., 1956) [Silva Herzog, 1964, pp. 122-123].

Table 1. Area Contained by Selected Haciendas in Mexico, 1910

Location, State	Name of Hacienda	Hectares
Chihuahua	La Santisima	118,878
"	Lagunita del Dosal	158,123
"	San Jose Bahiosa	63,201
"	Bachiula	50,000
Coahuila	Los Jardines	49,861
"	Sta. Teresa	60,899
"	San Gregorio	69,346
"	Sta. Margarita	81,185
"	San Blas	395,767
Mexico	La Gloria	132,620
Michoacan	San Antonio de las Huertas	58,487
Sonora	Corospera	51,528
Tamaulipas	El Sacramento	41,825
Zacatecas	Mal Paso	63,786
"	San Jose del Maguey	69,086
Total	15 Haciendas	1,464,592

Source: Gonzalez Roa, Fernando, El Aspecto Agrario de la Revolucion Mexicana, (Mexico, D.F.: Direccion de Talleres Graficos, 1919), pp. 137-138.

of 100,000 hectares. Tannenbaum points out that "...so unevenly was the land distributed that 2 percent of the country's rural properties included nearly all of the area in private hands" [Tannenbaum, 1966, p. 192].

This high concentration of land ownership in the hands of a few families was the situation in Mexico when the 1910 Revolution started. But in order to understand the events that took place during and after the Revolutionary War an understanding of the geography and the demographical situation of Mexico, in addition to the land holding situation, is needed.

Geography and Demography

The physical environment imposes some definite constraints upon Mexico. Most of the Mexican country consists of mountainous terrain--two-thirds of it. Two mountain sierras extend along its coasts and more than half of the total land area is more than 3,000 feet above sea level. These two sierras, running from north to south along each coast, the Sierra Madre Oriental (East) and the Sierra Madre Occidental (West), make farming difficult in most areas and completely impossible in others. An elevated plateau lies between these two mountain ranges. The Federal District, the capital of Mexico, is located on this plateau. The mountain ranges converge south of Mexico City and then, converted into one range, continue uninterrupted into the Isthmus of Tehuantepec.

The peninsula of Yucatan, also with level lands, extends into the Gulf of Mexico and the Caribbean Sea in the southern part of Mexico.

Not only are most of Mexico's lands at high altitudes and mountainous, but most of Mexico is dry--only about 13 percent of it receives adequate rainfall for farming during the whole year, and half of the territory is deficient in moisture in all seasons. The remainder is deficient in moisture either in the winter or in the summer season [Whetten, 1948, pp. 3-10].

Due to variations in Mexican topography, and to the geographic features of the country--from 32° to 15° north latitude--, all the different types of climate are present. Rainfall is scarce in some regions, abundant in others. Heat and cold, fertile and sterile terrain are all present in the country. The rivers, due to the closeness of their origin to the sea, are short, and most of them are non-navigable throughout their length. Consequently, they are not important for transportation purposes [Silva Herzog, 1964, p. 398].

Mexico can be divided into five general natural regions²², on the basis of its topography and climates (Figure 1). The Pacific lowlands consist of two regions--the North Pacific²³

²²For a more precise description see [West and Angelli, 1966; Whetten, 1948].

²³Includes according to the Mexican Agricultural Censuses the states of Sinaloa, Sonora, Nayarit and Baja California, and territory of Baja California.

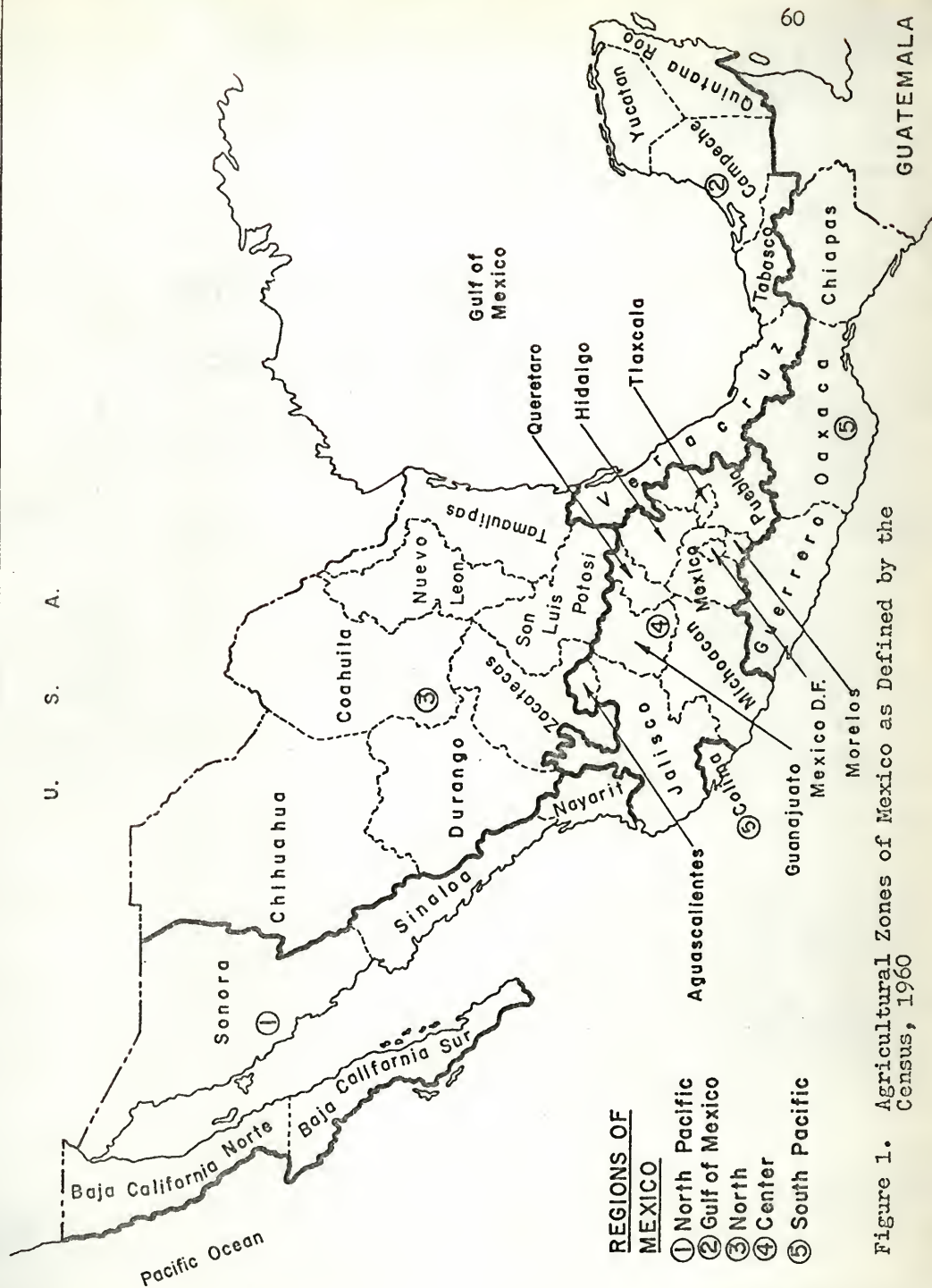


Figure 1. Agricultural Zones of Mexico as Defined by the Census, 1960

which extends in a narrow strip along the Pacific coast where the lands are mainly arid, and the South Pacific²⁴ where there is more rainfall, but level land suitable for agricultural use is scarce. The third region is the North²⁵ which is mainly steppes and deserts. The Central area is the fourth region²⁶ and is comprised of the central plateau and occupies the central part of the country where Mexico City is located. This Central region consists mainly of seven separate valleys and plateaus located at high altitudes. Rainfall is adequate for crop production during the summer. The fifth region is the Gulf Coast²⁷ --these lands generally have a tropical hot climate and receive the most rain of any area in Mexico; consequently, the vegetation there is varied and lush.

On the basis of climate and topography, the Agricultural Census of 1950 reported that only 10 percent of the total land area of Mexico was suitable for cultivation. Of this 10 percent, the Secretary of Agriculture reported that irrigation was needed on 63 percent of the tillable lands and was

²⁴Includes Colima, Chiapas, Guerrero and Oaxaca.

²⁵Includes the states of Coahuila, Chihuahua, Durango, Nuevo Leon, San Luis Potosi, Tamaulipas and Zacatecas.

²⁶Includes Aguascalientes, Federal District, Guanajuato, Hidalgo, Mexico, Michoacan, Morelos, Puebla, Queretaro, Tlaxcala.

²⁷Includes the states of Campeche, Quintana Roo, Tabasco, Veracruz and Yucatan.

necessary on 32 percent [U.S. Dept. of Agriculture, 1957, p. 10].

The characteristics of Mexican climate, topography and soil have influenced the geographic distribution of the population on the Mexican land. These features definitely influenced the pattern of Indian settlements. Large numbers of small communities were established throughout the isolated pockets of fertile land and in the Central Plateau (Meseta Central) where most of the best agricultural lands of Mexico are located [De la Pena, 1964, p. 433].

When the Spanish Conquistadors arrived in Mexico, they rediscovered the natural advantages for agricultural purposes of the Central Plateau. The location of the Indian settlements and the physical environment also influenced the Spanish patterns of settlement. It was in the productive valleys of the Meseta Central, where the Indian villages were located, that the first "encomiendas" and "mercedes reales" were given. It was in the Meseta Central where the "hacienda" was developed first [McBride, 1923, pp. 21, 45-46].

The conditions of Mexican topography and climate, the distribution of the population, the extremely scattered Spanish form of settlement, the technical knowledge of the period—all these conditions created an environment favorable toward the formation of large, self-sufficient units of operation [Chevalier, 1963, p. 49].

The hacienda was most fully expanded and developed around the Central Plateau where the Indian landholding villages were initially located at the time of the conquest. The hacienda expansions through the years continuously reduced the Indians' landholdings while their population was increasing. Also, the Indian settlements were being reduced to the mountainous regions surrounding Mexico City. In 1910, the haciendas held 81 percent of all the inhabited communities in Mexico. In each of the six states situated in Central Mexico, the hacienda system included more than 90 percent of all the villages included in each state. "The attacks on the villages by the [haciendas] ...during the Diaz regime were most insistent where the villages persisted and these villages ultimately made the social revolution in self-defense..." [Tannenbaum, 1966, p. 1932]. In 1910, the Mexican Revolution was started.

CHAPTER IV

OBJECTIVES AND MEASURES OF LAND REFORM AFTER THE 1910 REVOLUTION

During the Diaz regime (1876-1910) the basic policies were to bring peace and progress to the country and to encourage foreign investors to bring their know-how to Mexico. Diaz was not concerned with how this policy would benefit the masses nor was he concerned with social justice. His objective was to promote the nation's economic growth by breaking up the communal lands, "...for, if the land remained in the hands of the peons, increased agricultural yields would never be forthcoming..." [La Cascia, 1969, p. 5]. The main beneficiaries of these policies were his political associates and the large property owners.

To accomplish his objectives, Diaz governed as an Amerindian chief (cacique)--in a completely totalitarian way. His desires were the equivalent of the law of the times, and the political life of the country almost completely disappeared [Lopez Rosado, 1963, p. 362]. Diaz' police-state tactics were ruthless. His rural police force (the rurales) intimidated, imprisoned or, using the Escape Law as a pretext, assassinated political prisoners [Simpson, 1941, p. 284]. Young intellectuals became discontented and the

landlord bourgeoisie felt threatened by the power of the army generals. Francisco Madero, who later was to be the first president of Mexico in its revolutionary period, published a book against the reelection of Diaz [Madero, 1908]. The principle of "no reelection" was gaining force among the people; consequently, Diaz decided to make a political move in order to gain some time. He made an official declaration saying that the Mexican people were mature enough to have a true democratic system; therefore, he would welcome the participation of opposition parties in the coming presidential elections of 1910. This statement encouraged the activity of the Partido Antireeleccionista, with Madero as a leader [Lopez Rosado, 1965, p. 243].

Immediately thereafter, Diaz felt that this political statement had backfired; consequently, he decided to imprison Madero and run alone for the office of President. Madero escaped to the United States and proclaimed the Plan de San Luis (October 1910) which called for open rebellion against the Diaz regime. The Plan de San Luis was mainly politically inspired; "Effective suffrage, no reelection" was the main theme. Only a passing reference was made to agrarian injustices.

Madero in his Plan mentioned the case of the Mexican Indians, illegally deprived of their properties due to abuses in the application of the Baldios Laws, and proposed that

those who by immoral ways had acquired those lands would have to return them. If those illegally acquired lands had already passed to third persons, he proposed that their original legitimate owners be compensated [Manzanilla Schaffer, 1964, p. 36].

The rebellion against Diaz expanded through Mexico, and due to the general dissatisfaction against his regime, the revolutionary leadership came from all classes. Emiliano Zapata, a share cropper in the state of Morelos, started the rebellion in the South, while Pancho Villa united the peons in the North. Despite the only passing reference to the agrarian problem by Madero's Plan de San Luis, the Indian communities had to fight against Diaz for their survival. It was in the states where the land holding Indian villages had survived as an important population group that the agrarian problem developed and the Revolution was really fought.¹

Despite the fact that the Mexican revolutionary leadership came from elements of all the social classes, the national political leadership went to the hacienda owners (hacendados) such as Madero, and later Carranza and Obregon. These persons were not really concerned with the Mexican peasants' problem of obtaining a deep and fundamental reform in the Mexican

¹The states of Morelos, Guerrero, Oaxaca, Puebla, Hidalgo, Tlaxcala, Mexico, Veracruz [Tannenbaum, 1966, p. 197].

agrarian structure. Their concern was with the political system and an abstract ideal of liberty. Their reference in political speeches to the peasants' problem was a pragmatic one, for the purpose of gaining control and consolidating their political power.

During the war against the Diaz forces, the revolutionary forces of Zapata and Villa distributed land in their occupied territories. Zapata gave land to the peasants who had previously worked it, and villages moved back to the land that once belonged to them. Villa gave land to disabled veterans and victims of the war. Indians and peons, with guns in hand, began to cultivate the land, even without a "legal" title to it.

Diaz left and Madero became president of Mexico. Zapata and Villa continued to distribute lands in their occupied territories. When the hacendados felt themselves threatened by these movements, President Madero in June 1912 expressed to the press that, "...one thing is creating the small property, through sustained effort and another is to distribute the great properties, which I have never thought nor offered..." [Mendieta y Nunez, 1964, p. 172]. These ideas, expressed by Madero in 1912, had been already understood by the peasants through Madero's temporizing on the fundamental agrarian issues [Silva Herzog, 1964, pp. 178-179]. The Mexican peasants in the South, under the leadership of Zapata, proclaimed the Plan of Ayala (November 1911), which characterized Madero as a

traitor to the revolution, and expressed in the seventh article, "...expropriation, previous indemnization of one-third of those [land] monopolies..." so the Mexican villages could "...obtain ejidos, colonies, 'fundos legales' for towns or planting or labor fields and improve in all and for all the lack of prosperity and welfare of the Mexicans..."² The eighth article established the nationalization of the properties of the hacendados who opposed the Plan de Ayala.

In February 1913, General Victoriano Huerta, War Minister of Madero, plotted and accomplished the assassination of President Madero and his Vice President, Pino Suarez. Venustiano Carranza, an hacendado like Madero, who was Governor of the state of Coahuila, with the support of Zapata and Villa was proclaimed First Chief of the Constitutionalist Army. Carranza in his Plan de Guadalupe (March 1913) proclaimed as his objective the restoration of the constitutional form of government which was destroyed by Huerta. Carranza did not make any comment with reference to the social reforms demanded by the country. When Carranza's deeds and words showed no interest for land reform, Villa and Zapata withdrew their support [Lopez Rosado, 1963, pp. 372-373].

In a political move, in order to regain strength and

²During the first year of Madero's government, communal lands continued to be divided and given to the individual members, lands which later by different methods were alienated and transferred to hacendados [Wilkie, 1967, pp. 43-45].

popular support, in December 1914, additions were made by Carranza to the Plan of Guadalupe that included explicit social postulates of the movement. These additions state : "The First Chief of the Revolution [Carranza] in charge of the Executive Power will issue and enforce, during the fight, all the laws, dispositions and measures intended to give satisfaction to the economic, social and political needs of the country, effecting the reforms that the public opinion demand as indispensables to impose a regime which guarantees the equality of the Mexicans among themselves; the agrarian laws that will favor the formation of the small property, dissolving the latifundios and restituting to the villages the lands of which they were unjustly deprived, ...legislation to improve the [living] conditions of the rural peon..." [López Rosado, 1963, pp. 373-374]. Also, the additions announced that the large haciendas would be divided on the basis of public utility. Indemnization was not mentioned [Silva Herzog, 1964, p. 231].

The next month, January 1915, from the city of Veracruz, where he had been driven out by the forces of Villa and Zapata, Carranza dictated the decree of Restoration and Dotation of the Ejidos to implement the additions of the previous month. This decree became the legal basis for the distribution of the land.

The main concern of the decree, which was signed by Carranza and written by the Licenciado Luis Cabrera, was with

the villages that had or had not had ejidos, but whose right to have them was recognized as a necessary means of economic survival. To reestablish peace in the Republic, the Carranza Government recognized the necessity of restituting ejidos to the villages and giving lands to the ones who had never had them.

The word "ejido" in the decree of January 1915 should not be interpreted in the sense of the Spanish "ejido," i.e., land to be used by the Indians' cattle. The meaning of ejido in the decree was that of the land destined to support the villages [Mendieta y Nunez, 1964, p. 177].

The decree authorized the states' military governors to endow or restitute ejidos to the villages³, provisionally⁴, provided that the appropriate titles were filed at the time of the restitution petition. This decree also established the National Agrarian Committee, with a cumbersome system of local committees, in order to enforce the law. The National Agrarian Committee was to function as a court in the review of the actions of the military governors.

The lands to be donated to the villages were to be taken only from haciendas adjacent to the villages and the decree also provided that the parties affected adversely by the decree

³By decree of September 19, 1916, Carranza suspended the provisional dotations and restitutions, based on the uncertainty that they created for both the hacendados and the ejidatarios.

⁴"Not all villages could file claims; they must fall within some specific political-legal categories..." [Simpson, 1937, pp. 174-175].

had the right to appeal to the courts within a year [Mendieta y Nunez, 1964, pp. 179-181].

The decree did not cover one important aspect of rural Mexico. The haciendas' resident laborers were left outside the provisions of the law. The concern of this decree was only with the villages without land [Tannenbaum, 1966, p. 201]. Most historians agree that Carranza's January 1915 decree was motivated by pragmatic political-military considerations. At that time he did not have to worry about its possible economic effects, as the economy was already disrupted by a civil war that started in 1910 and had the country divided into several factions. The Law of 1915 was enforced in its beginning in an irregular way. The Civil War was underway, so the law was applied according to the political interests and passions prevailing at the time. In many instances the dotations and restitutions of lands to villages were made through military confiscation of property.

Once the Carranza forces had returned victorious to Mexico City, and he had been elected president of the Republic, a constitutional convention was called to write a new constitution for Mexico. This constitutional convention met in 1917. Article 27 of the Constitution outlines the policy to be followed by the revolutionary governments with respect to the agrarian problems of the country. "Article 27...was not an individual work but a collective one. No person could claim having been its exclusive or principal author; not even

could it be said that its only authors were the constitutional delegates of Queretaro...[It was] the work of our great social thinkers and the Mexican people" [Silva Herzog, 1964, p. 256].

The previous statement of Silva Herzog has been expanded by Senior [Senior, 1958, p. 25], who noticed three distinct ideologies during the struggle for establishing new agrarian institutions in Mexico. One of these, prevailing in the Central Plateau and to the south of it, was represented by Emiliano Zapata and his followers and had its roots deep in the Mexican Indian tradition. They wanted to recover the lands stolen from their ancestors by the Spaniards and Criollos from the time of the Conquest to the then present time. In this area some of the land holding villages were still in existence. These villages had to fight for their survival and for recovering their lost land. Zapata and his followers were the fighters for the communal ejido type of land holding property.

Another ideology, a different source of influence, came from the "men of the north," such as Villa, Carranza, Obregon, and Elias Calles. These men were not peasants; most of them were middle class "rancheros," schoolmasters or hacendados. Villa was recorded by some historians as a "bandit" chieftain [Parkes, 1938, pp. 319-334]. These men had spent most of their lives outside the main zones of Indian Mexico--in states such as Coahuila, Chihuahua and Sonora, where the population

density was relatively low, compared with central and southern Mexico. And as Molina Henriquez [Molina Henriquez, 1936, pp. 143-147], one of the intellectuals of the Mexican agrarian movement, pointed out, the "men from the north" were not only closer geographically, but also intellectually to the U.S. ideas of laissez faire, individual private property, and the Jeffersonian type of agrarian democracy. They tended to overlook the distinctive characteristics of the large share of the Mexican rural population that had a low educational level and no experience with private property.

The third ideology, as mentioned by Senior, was the result of the ideas of urban intellectuals such as licenciados Luis Cabrera and Andres Molina Henriquez. These men had never lived in the rural areas and thus had not directly suffered the experience of life there. They reflected a more conservative position which was based on their observations that the hacienda peon worked only part of the time on the hacienda and the rest of the time he had nothing to do. They proposed that the hacienda worker should be given a subsistence plot on which to use his forced leisure time in order to supplement his hacienda wage.⁵

⁵"The agrarian problem should be resolved by the exploitation of the ejidos as a means to supplement the salary of the day laborer..." [Cabrera, 1913].

These different ideologies were expressed in Article 27 of the 1917 Mexican Constitution⁶ as follows: "The property of the land and water within the boundaries of the national territory belongs originally to the Nation, who had had and have the right of transferring their dominion to particulars, constituting the private property." Immediately following that statement, it expresses the right of the nation to supervise the use and distribution of the real estate properties, "The Nation will have always the right to impose to the private property the manners dictated by the public interest, as well as regulate the exploitation of the natural elements subject of appropriation, in order to make an equitative distribution of the public riches and care of their conservation. With this purpose, the needed measures will be dictated in order to fraction the latifundios; to develop the small property, to create new agricultural population centers with the essential lands and water; to foment agriculture and avoid the destruction of the natural resources and the damages that the property could suffer in prejudice of society." Also it stated that "The villages, 'rancherias' and communities lacking land and water or not having them in sufficient amount for the necessities of its population, will have the right to be provided with them, taking them away

⁶For a complete transcription of Article 27 of the 1917 Constitution of Mexico, see [Silva Herzog, 1964, pp. 250-255] who reproduced it from the official edition published by the Secretaria de Gobernacion.

from the adjacent properties, respecting always the small properties... The acquisition of individual properties in order to achieve the above mentioned objectives will be considered as public utility."

In other paragraphs of Article 27 it is ordered that each State should establish laws establishing the maximum territorial area within their respective jurisdiction that could be owned by a single person or by a legally authorized Mexican corporation. The land in excess of the maximum area established by the States should be divided and sold by the owners, or if the owners rebelled against this disposition, the fractions would be sold under easy terms--20 years, 3 percent annual interest---by the local governments.

Article 27 also established that any expropriation of real estate property must be by cause of public utility and through indemnization⁷, but did not mention that this must

⁷Despite this stipulation by the Mexican Constitution of 1917, in practice, very few of the persons affected by the agrarian reform in the years ahead were compensated. This was due to practical reasons--it was impossible for the Mexican treasury to do so. It did not have the means. Edmundo Flores concluded that "Only 170 national [Mexican] claimants were indemnized...for the expropriation of...0.55% of the total of 40 millions of hectares distributed up to date [1964]. The indemnization...[was] paid in bonds of the agrarian public debt. The rescue of those bonds was accomplished by purchases in the market, at quotations that fluctuated between 5 and 16 percent of their nominal value; or receiving them, also with penalty, in payment of certain taxes; or exchanging them in selected cases, for bonds of the internal public debt of 40 years. Besides, an unspecified number of influential large property owners was indemnized with bonds of the internal public debt, or compensated with rural or urban lands, or in cash; or in the three cited ways. The extension of the lands acquired in this way (as well as the amount of compensation) is unknown, but conjectures can be made, that, as in the

be done previous to the expropriations. It reestablished the legal capacity of the population nucleus in a communal state to hold land, forest and water in common, and it nullified the alienation of water, land and forest belonging to villages authorized by political chiefs since December 1, 1876. It also nullified the surveying and demarcation activities which had been taking place in detriment to population centers. Exceptions were made of those properties alienated according to the law of June 25, 1856, and which covered less than 50 hectares and were possessed under dominion title for more than 10 years.

According to Article 27, only Mexican citizens could own land, subsoil and mineral rights. However, if the foreigners agreed to be considered as Mexicans with respect to those commodities, and not to request in any case the protection of their respective governments, they could acquire them. No church could hold or administer private property, except for religious or public service purposes; the same condition was true with respect to banks, but these were allowed to make loans on real property, and hold real property temporarily in case of default by their clients.

Article 27 of the Constitution, besides expressing nationalistic views that prevailed in a country that had

previous case, it represented an insignificant fraction of the total distributed. The rest of the lands given to the ejidatarios were expropriated without indemnization. The peasants benefited by the agrarian reform received their lands freely" [Flores, 1964, pp. 335-336].

suffered two foreign invasions [Cosío Villegas, 1966, p. 75] in the previous century, also kept the Juárez doctrine and the liberal ideas of 1856 with respect to the church holding real estate property. Beyond these points, the Article provided enough margin and latitude to include within it all the different ideas with reference to land reform that prevailed in Mexico. The restoration of communal lands, of which the villages had been previously deprived, initially expressed in the 1915 decree and ratified in Article 27, was a political and expedient measure by President Carranza to help consolidate his position and to pacify part of the rural sector, which previously had supported Emiliano Zapata.

A Mexican economist, Ramon Fernandez y Fernandez, has clearly expressed these early beginnings of the Mexican agrarian reform: "[It] was the result of an uprising...not a pacific undertaking, nor was it a policy planned for the solution of economic problems. The politicians who directed its first stages...never [had] any intention of doing what later was done. The reform was accomplished amid conditions of violence and political animosity, frequently among those with guns in hand, and in the midst of chaos and bloodshed. Agrarian reform was the way of returning to the promotion of peace" [Fernandez y Fernandez, 1968a, pp. 158-159].⁸ It was

⁸In this respect, Edmundo Flores correctly pointed out that prior to the Mexican land reform there were no precedents or theoretical works which could have guided the process, even if its leaders would have welcomed them [Flores, 1964, p. 312].

a pragmatic process of trial and error, "The Mexican agrarian reform established its course and acquired its impetus in the pursuit of a restitution of land and the ends of social justice, and in accord with the political necessities of the opposing factions; but it was never planned in terms of improving the system of land tenure to make it favorable to agricultural progress" [Fernandez y Fernandez, 1968a, p. 159].⁹

The 1917 Constitution provided for a strong president, who was given the right of veto and the right to initiate legislation as well as the right to issue personal decrees in special circumstances [Vernon, 1963, p. 63]. The political atmosphere and the personal ideas of each president--who had the power of interpretation and application of the agrarian laws--later influenced decisively the course of the Mexican agrarian reform (Table 2).

During the period immediately following the Constitution of 1917, the first presidents became concerned with the possible economic effects of the program in terms of the risk of disrupting the economy at a time when the foreign press, the diplomatic corps, and the ex-supporters of Diaz were claiming the adverse effects that would take place in the

⁹The same idea is expressed by another prominent Mexican agricultural economist, Jesus Silva Herzog: "When the revolution succeeded it was necessary to give the land to the peasants, this land had to be given without any definite plan, or program, subordinating the distribution move to the political necessities of the moment than the techniques of such a complex problem would advise. It was not possible to engage in investigations, through studies, complete and in detail, there was no other choice" [Silva Herzog, 1944, p. 64].

Table 2. Distribution of Land to Ejidos,^a by Presidential Periods, Mexico, 1915-1970

President	Period	Hectares (1,000)
Carranza, V.	1915-20	224
Huerta, A. de la	May-Nov. 1920	158
Obregon, A.	1920-24	1,677
Elias Calles, P.	1924-28	3,195
Portes Gil, E.	1928-30	2,066
Ortiz Rubio, P.	1930-32	1,204
Rodriguez, A.	1932-34	2,095
Cardenas, L.	1934-40	20,073
Avila Camacho, M.	1940-46	5,328
Aleman, M.	1946-52	4,058
Ruiz Cortines, A.	1952-58	3,664
Lopez Mateos, A.	1958-64	16,004
Diaz Ordaz, G.	1964-70	23,056 ^b
TOTAL		82,802

^aThe word ejido, "...in Mexico at the present time... is used to refer to all types of lands which have been restored or granted to agricultural communities, under the agrarian law initiated in 1915. By extension, the word is used [as in this case] to designate the communities possessing such lands" [Simpson, 1937, p. VIII].

^bPreliminary data up to Sept. 1, 1970.

Source: Flores, Edmundo, Tratado de Economia Agricola, (Mexico, D.F.: Fondo de Cultura Economica, 1964), p. 311; Nacional Financiera, S.A. La Economia Mexicana en Cifras (Mexico, D.F.: Nacional Financiera, S.A. 1965), p. 56; Ross, John B. The Economic System of Mexico, (Stanford, Ca.: California Institute of International Studies, 1971), p.3.

agricultural sector if the program was enforced. Consequently, the redistribution of lands was implemented slowly up to 1934. Measures and counter-measures followed each other.¹⁰

In December 1920, the Ejidal Law was proclaimed by Obregon, the new President, to regulate Article 27 of the Constitution. It specified that the lands could not be given to the villages until the President himself had reviewed the governors' resolutions, that the population nucleus must provide evidence of their necessity for lands before they could claim them¹¹, and that the area of the

¹⁰Alvaro Obregon in a conference given as a presidential candidate in 1919 stated, "I am a supporter of the development of the small agriculture...but do not believe that...the way to foment it is breaking up the large properties...we all have the obligation of helping those who want to improve themselves, without the necessity of hurting the interests of others." Alvaro Obregon, El Problema Agricola y Agrario (Guadalajara: Tipografia Feniz, 1920) cited by [Silva Herzog, 1964, p. 273]. Obregon, after being elected president expressed similar concepts: "We should not destroy the large properties before creating the small ones...we should proceed cautiously;" at the same time he stated that "The right of rural man...[to] have at least a piece of land where his personal effort will enable him to support his sons," i.e., that he was in complete agreement with giving ejidos to the villages. [Alvaro Obregon, El Problema Agrario (Mexico, D.F.: Ediciones Centro Director Obregonista, 1920)] cited by [Silva Herzog, 1964, pp. 274-276]. Obviously, this was not a logical and consistent position. On one side Obregon was against breaking up the latifundios without establishing first the small property, but the restitution and dotation of lands to the villages--which he also supported--implied the destruction of the large haciendas.

¹¹They could prove this in several ways: show that they lacked the needed land to obtain through its cultivation the earnings double the average wage in the region; or show that latifundios were adjacent to their fundo legal; or show communal possession before June 1856, but for which they held no title.

ejidal parcel should be sufficient for producing twice the daily wages in the region. This idea of the area of the ejidal parcel did not take into account that the wages were pretty low at that time and were fluctuating widely [Mendieta y Nunez, 1960a, p. 86]. Obregon, by presidential decree, abrogated the Ejidal Law in November 1921 and at the same time accelerated the procedure to provide lands to the villages by authorizing the governors to grant lands to them provisionally. The Agrarian By-Laws (Reglamento Agrario) of 1922 specifically established the ejidos¹² and their areas.

The Reglamento Agrario specified that each family head, as a member of an ejido, should receive between three and five hectares in irrigated or humid terrain, four to six hectares in "temporal" terrain (i.e., receiving rain abundantly and periodically), or six to eight hectares in other less productive soils. The decree of 1922 established the limits of the small properties that could not be expropriated in order to provide lands to the ejidos; these limits ranged from 150 hectares in irrigated or humid land to 500 hectares in land of lower quality than the "temporal" lands. Also, the agricultural units operated in an industrial way would

¹²The term "ejido" here refers to the system whereby villages hold lands in common, the ownership rights belonging to the population center as a whole. By extension the word ejido has been applied to any population nucleus holding land in this way. The ejidal lands may be worked in common, as in a collective ejido, or they may be divided among the ejidatarios--individual members of the ejidos--and worked as private plots.

be exempted. This exemption specifically applied to the plantation type of agriculture (cotton, sugar, henequen) that employed the most advanced methods under foreign management, most of them located in the Laguna region (North Central Mexico) and in the Yucatan Peninsula.

The situation that prevailed in Mexico at that time was one of legal and economic chaos in many aspects. The Minister of Agriculture, Luis Leon, in a speech to the "Camara de Diputados" (House of Representatives) in September 1925 stated that the local administrative committees in charge of the agrarian reform program were exploiting the ejidatarios via reallotments after planting, and due to this practice and the uncertainty created by the program, the agricultural production of the country had fallen [Simpson, 1941, pp. 321-322].

In 1926, President Calles created the National Bank of Agricultural Credit, which was associated with local cooperatives [Duran, 1956, p. 316]. Despite all the laws, decrees, resolutions, rules, etc., of the period from 1915 to 1927, no law prior to 1927 was passed that specified how the lands acquired by a village could be worked and divided among its inhabitants. This was done by the Law of Patrimonio Ejidal (Ejidal Patrimony) and its subsequent reforms. This law established a "Comisariado Ejidal" (Executive) to administer the ejidal possessions and provided for a "Consejo de Vigilancia," to oversee the "Comisariado Ejidal," that was to

be elected by the members of the ejido. The ejidal properties were considered inalienable. Communal property of the villages over their lands was established with possible individual possession and use of the lands and with the obligation of cultivating the land. Usufruct rights could be inherited. The law also established that the National Agrarian Commission would designate in each ejido the lots to be used for urban zones, pastures, and the school. The crop lands would be divided into lots in accordance with the specified required minimum area. This minimum area would depend on the quality of the soil.¹³ In April 1927 the Law of Dotations and Restitutions of Lands and Water provided that all the villages having at least 25 families (later it was reduced to 20) could ask for land under the agrarian reform program. The resident plantation laborers ('hacillados') continued to be excluded from the benefits of the law. This law also made the expropriation proceedings a trial of the courts that would involve complicated judicial steps that ended in the administrative resolution which in reality was similar to a court sentence.

This law increased the alternatives available to the landowners. Previously they had only the right to claim indemnization, but now they could also contest the expropria-

¹³In practice, the divisions were made according to the number of ejidatarios and not according to the minimum lot sizes; therefore, many ejidatarios received lots with area below the minimum legal size.

tion. This agrarian trial, in practice, resulted in confusion and in slowness in the application of the agrarian reform program due to illicit activities of the bureaucracy.

During the period of 1928 to 1934¹⁴, the legislative activity in agrarian matters continued to reform old laws and to establish new ones and reform them sometimes. But the most significant legislative activities of these years were the Reform of Article 27 of the 1917 Constitution and the Agrarian Code of 1934. The implementation and interpretation of these two measures were the bases on which the next President, Lazaro Cardenas, justified his intense activity of land redistribution. During this period, 1934 to 1940, more than 20 millions of hectares were distributed to the ejidos--nearly twice the area of all previous presidents (See Table 2).

The decree of January 9, 1934, which reformed Constitutional Article 27, specified that the only exemptions from expropriation of land for distribution to the ejidos was the small agricultural properties under cultivation. When these properties were uncultivated, that is not fulfilling their social function, they could also be expropriated. In a decree

¹⁴One of the presidents of this period, Ortiz Rubio, supported the idea of the ejido as a social enterprise, not as the main instrument of agricultural development of the country. "The ejido is not and nor should it be the principal responsible for the agricultural development of the country; its production is destined to its own consumption and only an excedent can go to the external markets [Silva Herzog, 1964, p. 388].

six days later the National Agrarian Commission, set up by the Law of January 1915, was abolished and the Agrarian Department was created and placed under the direct supervision of the President. This new Agrarian Department took over the previous functions of the National Agrarian Commission.

The agrarian legislation was so abundant and chaotic that the situation led to the first agrarian code--the Agrarian Code of 1934 (March 22)--which was passed under the Presidency of General Abelardo L. Rodriguez.¹⁵ No person is better qualified to explain it than the General himself:

"...the executive power under my care... incorporated into the new Agrarian Code all the legislation until now dispersed, constituting one body which encompasses the Laws of Dotation and Restitution of Lands and Waters, the one of Distribution of Ejidal Lands and Constitution of Ejidal Patrimony, as well as the one of Creation of New Centers of Agricultural Population; the dispositions concerned with the National Agrarian Registry... In reference to the dispositions known until now with the name of Ejidal Patrimony, the new Code establishes the regime and modes of the agrarian property, and precepted that at the same time that the presidential resolutions were executed, the adjudication of individual lots among the ejidatarios be done,

¹⁵During the Mexican Constitutional period of December 1, 1928 to November 30, 1934, Mexico had three presidents. Thus, despite the fact that the Civil War had ended, political stability still had not been achieved. General A. Obregon, President-elect for a second term was assassinated before taking office. E. Portes Gil was the President between 1928-30; Pascual Ortiz Rubio, 1930-32; and after his resignation, General A.L. Rodriguez was President until 1934, when General Lazaro Cardenas was elected President.

establishing, besides the succession regime...that only will be of a communal ownership and exploitation the pastures and forests and waters, or those lands which, due to its own peculiarities in the exploitation process, deserved the collective intervention of the ejidatarios... The end of the work of the agrarian reform fundamentally rests on the organization of the ejidatarios. The new Code put the National Bank of Agricultural Credit in charge of this process, with exclusion of any other authority in those zones where it operates or where gradually was expanding its activities, pursuing with this that the institution fulfill the essential finality for which it was created, channeling the credit among the ejidatarios, organizing them...[were] other...new fundamental aspects of the agrarian reform introduced by the new Code...which had considered all the interests involved in the agrarian problem and which had tried to give solutions which definitely lead the agricultural economy of the country, in benefit of the collectivity...The problem created by the previous laws in reference to the definition of the small property made insecure its determination on account of the elasticity of the classification of lands and the extension of standard lots. The new Code establishes only two classes of lands and rigid areas for the endowment of lots, with which diverse interpretation criteria are avoided and the necessary security is given to the small agricultural property in unaffected exploitation in the terms of the Constitutional Article 27, not only surrounding it of guarantees in the chapter of responsibilities and sanctions of the agrarian functionaries, but allowing the owners to choose and situate in any moment, the area on which they wish to locate their small agricultural property, inviolable according to the constitutional precept and through declaratory of the President of the Republic, which will be recorded in the National Agrarian Registry" [Silva Herzog, 1964, pp. 367-368].

Some outstanding points of the Agrarian Code of 1934, especially those related to the distribution of land, are as follows [Mendieta y Nunez, 1964, pp. 235-241]:

- (a) It added the requirement that the village applying for land must be in existence prior to its application.
- (b) It established exactly four hectares of irrigated land as the ejidal-lot (and other sizes for other types of land) and required that each ejido must be provided with forest, pastures, and lands for communal use.
- (c) It abolished the previous legislative requirement of a 10-year waiting period before enlargement of the ejidal lands.
- (d) The creation of new centers of agricultural population was tied to the dotation process to enlarge the ejidos.

These points continued to utilize concepts prominent in colonial laws, when the distribution of lands was tied to the existence of a village. But in a departure from that approach, the new Agrarian Code tried to bring the benefit of the Agrarian Laws to those workers residing permanently in the haciendas and other rural workers who were subjected to economic dependence on the hacendados. Thus an additional element in the new Agrarian Code recognized the "peones acasillados," who previously were excluded in the census of

the neighboring villages, for the purposes of obtaining ejidal lands or establishing new agricultural population centers [Martinez Baez, 1934, pp. 261-262].

Another important item in the 1934 Agrarian Code, as mentioned by General Rodriguez, was the establishing of the right of land owners to select the lands and location which should be exempted from expropriation. This right provided the owners with security as they would know which part of their properties would be unaffected. At the same time this policy could be expected to make available for the ejidos the least productive land.¹⁶

In 1934, General Lazaro Cardenas became President of Mexico. Cardenas decided to accelerate the agrarian reform program. During his presidency, as indicated earlier, more than 20 millions of hectares were distributed under the agrarian reform program. There were important acts during the Cardenas administration in agrarian matters, as well as in other fields. These acts included, among others, nationalization of the oil industry and railroads, and re-organization and strengthening of the labor movement.

Until the time of the Cardenas administration, after more

¹⁶"In the ejido abound more than in the private property--soils of bad quality" [Duran, 1937, p. 71]. "In reference to the ejidal lands, we could say that in the State of Puebla the average acres of the ejidal lot is of 7.3 hectares, but in fact this area is reduced to 2.71 hectares of work-land" [Garcia R., 1942, p. 254].

than almost two decades of agrarian reform and its implicit land distribution program, the ejidos controlled less than 10 percent of the non-public land in Mexico. (The Agricultural Census of 1930 reported only 6.3 percent of the land as ejidos). Most of the ejidal land was around the edges of the large estates and included the least productive land. There was insufficient or no credit facilities and in general they were without any type of agricultural extension services. Previously, land redistribution had been confined to corn and bean subsistence plots. Now, with Cardenas' action in the Laguna, for the first time an area of commercialized agriculture was being distributed.

In October 1936, Cardenas implemented the agrarian reform in the Laguna region--a fertile area in the north-central part of Mexico (Coahuila, Durango, Baja California), owned by a few large landowners who produced cotton and wheat.¹⁷ Ejidos were established in the region, but cultivation was on a collective rather than an individualized basis. Cardenas' thought was expressed in his message to the nation on November 30, 1936. "There could have been, in some early epoch of the Revolution, those who considered the ejido as a mere supplement of the day wages, insufficient .

¹⁷In the 1930's, La Laguna supplied almost 50 percent of the country's cotton and ranked third as a region in the production of wheat [Senior, 1958, p. 47].

to guarantee to the worker the economic independence which is the fundament of all the liberties...the ejidal institution has today a double responsibility upon itself; as a social regime...and as a system of agricultural production...the necessity of providing to the feeding of the country... La Laguna region is a typical case of unaffordability for a parceled system of cultivation. The distribution of profits will have to be proportioned to the work of the ejidatario,... but the production has to be organized treating each village as a unit, because only in this way will it be possible to obtain credit and acquire implements and tools which are out of the reach of the isolated individuals" [Silva Herzog, 1964, pp. 409-411].

In another of the important actions, Cardenas established the Banco Nacional de Credito Ejidal (National Bank of Ejidal Credit) in 1936 to provide credit to the ejidos, while the Banco Nacional Credito Agricola was left with the function of providing credit to the private sector. This action of Cardenas recognized the difference in the necessities and conditions of the two sectors of agricultural production.

In 1937, in another action similar to the one taken in La Laguna region, Cardenas extended the agrarian reform to the important henequen region of the Yucatan and Campeche and, in 1938, to the rice producing Lombardia and Nueva Italia haciendas in Michoacan.

During the years of the Cardenas administration the

expenditures of the government for irrigation, which amounted to about 4 percent of total federal expenditures in the previous administration, was increased first to about 8 percent per year and in 1939 to 12.2 percent [Oribe Alba, 1960a, p. 196]. This action took notice of one of the main problems of Mexican agriculture--the need of irrigation in order to increase the land available for agricultural purposes.

The actions taken by Cardenas indicates that he was aware of the relevance of the ejidos as a social regime as well as its importance in production. Thus, in March 1937 he signed the Law of Fomentation of Cattle Raising. Cattle ranchers, afraid of losing their investments if they were affected by the agrarian reform, were refusing to increase the size of their cattle stock. Cardenas' law guaranteed for 25 years the exemption of land used for cattle raising, from expropriation procedures, where there were at least 500 heads of cattle (or 300 if milked, or the equivalent in sheep) and if the agrarian necessities of the region were satisfied or could be satisfied with lands within a radius of 7 km. (or if the landowner agreed to buy other lands in favor of the ejidatarios). The certificate of exemption could cover from 300 hectares in the more fertile areas to 50,000 hectares in the desert areas [Mendieta y Nunez, 1964, p. 247].

In September of 1940, Cardenas signed a new Agrarian Code, which was a repetition of the 1934 Code, but included

the agrarian legal measures approved in the Cardenas period discussed above.

At the end of 1940, a new president took power in Mexico and changed the agrarian policy. This change is reflected in the change of the name of the official party of Mexico. During the Cardenas epoch the official political party in government since the Revolution had called itself the Party of the Mexican Revolution (Partido de la Revolucion Mexicana). Avila Camacho, who took office as President in 1940, changed the name to the Party of the Institutionalized Revolution (Partido Revolucionario Institucional).

In a prelude of what was going to be his agrarian policy, President Avila Camacho, in his inaugural address in December of 1940, stated that "...the entire Republic demands now the material and spiritual consolidation of our social gains into a prosperous and powerful economy--after having assured by law a just distribution of production, it would be inexcusable not to convert Mexico's abundant national resources into a strong economic structure" [Baklanoff, 1961, p. 504]. Consequently, his policies and those of his immediate successors were intended to increase production and bring more land into cultivation and less emphasis was placed on distribution of land to villages (i.e., the policy was to guarantee the rights of the existing small property owners and ejidatarios and to encourage the bringing of more land into cultivation through colonization programs of

inhabited areas in the coast and creation of new irrigation districts).

The main point of the agrarian policy of Avila Camacho was to provide agricultural activity with legal security, i.e., to give security to the farmers in their possessions in order to encourage agricultural production. A new Agrarian Code was approved on December 31, 1942. The main points of this code, of which the main aspects have remained in force for the last 30 years, were as follows:

- (a) The creation of new agricultural population centers and settlement of peasants on vacant plots of the ejidos as ways of endowing lands to the peasants; the determinant element was the needs of the peasants for lands.
- (b) In order to be a recipient of land under the Agrarian Reform Program a person must be Mexican by birth, over 16 years old if he is a bachelor, or if a woman she must have a family under her care, must have been a resident of the place for at least six months in the case of dotation (this was not a prerequisite in the case of a new village or settlement), must have agriculture as his occupation and must not have an individual or commercial capital of more than 2,500 pesos (or over 5,000 pesos if it is in the form of agricultural capital).

- (c) A Certificate of Unaffectedability by the agrarian reform program would be given according to:
- (1) Area and quality of the soils---up to 100 hectares in irrigated lands.
 - (2) Type of crops---up to 150 hectares for cotton, up to 300 hectares for plantain, coffee, sugarcane, henequen, coconut, olive, quinine, vanilla, cacao or fruit trees.
 - (3) Use of the soil---national parks, reforestation, and cattle lands with at least 500 heads of cattle or the equivalent in the form of other livestock.
- (d) Different plots that belonged to one landowner, despite being separated, would be considered as one farm.
- (e) It specified that the denial of legal court injunction appeal ('amparo'), available under the Mexican legal system, referred only to the land-owners affected by the agrarian reform and not to the peasant petitioners of land.
- (f) The ejido was defined as the total area of land owned by a group of people, including land which could be classified as agricultural, for cattle raising, or for forestry, according to its use. Each ejidatario was given the right to an ejidal parcel except when the ejido was collectively

cultivated. (A decree in 1946 established the minimum limits of the ejidal lot as 10 hectares if the land was irrigated, 20 hectares if it was "temporal" or seasonal land.) In the ejidos that were collectively cultivated, the ejidatario was not given the use of an ejidal parcel, but he kept the right to the dotation unit and consequently to the products of the ejido. If and when the ejido ceased to be cultivated collectively, the unit of dotation should be transformed into an ejidal parcel. The collective cultivation of the ejidos was to be mandatory when the lands that constitute the ejido made an indivisible unit of cultivation, or when the ejidal products were destined to be processed in agricultural zones where they were produced.

- (g) Each ejido should be provided also with land for a village site, school lot, as well as with pasture lands, woodlands, or others different from the cropland, in order for the population center to satisfy the collective necessities.
- (h) The ejidal parcels could not be encumbered in any way and neither could they be leased out or in any way subjected to indirect cultivation including the use of salaried or hired workers. Thus, the ejidal parcels were inalienable, imprescriptible and not

transferable. But the ejidatario held the right to transmit his ejidal right in testament among those who depended on him. In order to keep the original idea of the ejido--enough land to support a family working the land--only one person would inherit the ejidal rights and that person was required to be one who previously had not held ejidal rights.

- (i) The ejidatario could have his rights of property suspended proportional or in total, if his parcel was not cultivated during a year or his collective duties were not performed. This suspension became definite if his lot was not cultivated for two years, and, in the collective ejidos, if his duties were not performed for that period of time.
- (j) The State, through the Agrarian Department and the Secretary of Agriculture and Fomentation, would exercise continuous supervision and protection of the ejidal activities and the ejidatarios [Mendieta y Nunez, 1964, pp. 262-350].¹⁸

Avila Camacho, in his last year as President, proposed and had approved the change of the name of the official party from Partido de la Revolucion Mexicana (PRM) to Partido

¹⁸The Agrarian Code of 1942 continued the division of responsibilities with respect to the ejidos among different government entities; the National Ejidal Bank, which as the provider of credit also supervised ejidal operations, was added to those listed previously. This complex organizational system contributed to more paper work and uncertainty, with adverse effects on the ejidos' production due to the low level of education of the ejidatarios.

Revolucionario Institucional (PRI). The emphasis was shifted from the developing of new institutions to improving the operations of those that had been developed.

Miguel Aleman took power in 1946.¹⁹ Under Aleman the emphasis on agrarian reform was continued along the trends established by Avila Camacho. The principal considerations were given to its economic aspects, while Cardenas in the period before Avila Camacho had put the emphasis on its social as well as its economic aspects. But now that the official party was firmly in power, the social instability had almost disappeared. Less emphasis was placed on ways and means of "dividing up the pie" and more emphasis was placed on "making the pie larger" [Maddox, 1960, p. 270].

In one of the Aleman government's first acts in December 1946, it changed the minimum size of the ejidal lot from the 3 to 5 hectares in irrigated land to at least 10 hectares in the same type of land, and 20 hectares was established as the minimum for temporal (seasonal) land. This measure was aimed at the problem of minifundia and un-economic ejidal lots that the agrarian reform program had established previously for its beneficiaries.

Also, immediately after Aleman had taken power, Article

¹⁹Miguel Aleman was the first civilian president of Mexico after the Revolutionary period of 1910-20; to date, Avila Camacho was the last military man to serve as president.

27 of the Constitution was changed. Aleman's modifications continued the basis of security and continuity with regard to private property in the agricultural sector. Previous legislation had only given the legal court injunction ('amparo') form of recourse to the beneficiaries of the agrarian reform; Aleman introduced a reform in the Article 27, so that private property owners who had obtained a certificate of exemption from the land redistribution measures could make use of the legal court injunction recourse. At the same time, up to 100 hectares in irrigated land or its equivalent in seasonal or other type of land, (150 hectares if cotton was being cultivated, and up to 300 hectares if sugarcane, plantain, coffee, henequen, coconuts, vine, olive, quinine, vanilla, cacao or fruit trees were being cultivated) were classified as small private property and thus protected from being affected by the agrarian reform program. These measures were passed in order to encourage more investments in agriculture by the private property sector.

The colonization laws and other laws in which the main purpose was to increase the volume of agricultural production through increases in the areas under cultivation should be considered in relation to the overall land program. In August of 1923, General Obregon issued the decree known as the Law of Free Lands. The purpose of this decree was to provide to the rural proletariat, part of the rural population that had been ignored by the agrarian reform legislation, the

opportunity to obtain land in accordance with their needs. The decree authorized any Mexican citizen, over 18 years old and without land, to acquire a limited²⁰ area from national lands or "baldias" (idle lands) that were not reserved for government purposes. The only requirements to acquire these lands were to occupy them, set boundary marks, and to cultivate them personally during two consecutive years. The only restrictions imposed on the acquisition of private property in these lands was that they could not be sold to foreigners, nor to Mexicans who already had an equal or greater amount of land than the set limits, and the lands could only be sold or mortgaged after having been owned for at least 10 years [Mendieta y Nunez, 1964, p. 447-450].

Enforcement of the Law of Free Lands was suspended in June 1926, as several problems were encountered. In many instances the occupied lands were neither national nor "baldias" (idle lands). Enforcement was reestablished in July 1934, and finally abrogated by the Law of Terrenos Baldios, Nacionales y Demasias of December 30, 1950 (Idle, National and Excess lands). This law defined as "baldios" (idle lands), the lands belonging to the Nation which had not been surveyed nor marked, national land was defined as land belonging to the Nation, already measured and marked, and "demasias" (excess)

²⁰ Twenty-five hectares of irrigated lands, 100 hectares if temporal (seasonal) lands, 500 hectares if pasture lands. These limits were reduced by 1/3 if the lands were close to a village, coast or navigable river.

portions of land were defined as land in excess of those specified in a title to a plot but within its boundaries. The 1950 Law specified that the three classes of lands mentioned above could be bought by any Mexican citizen, who did not own land, through a purchasing operation by paying 5 percent of the value of the land as an initial installment. The title to the land would be given to the buyer when the boundary marks were set, at least 30 percent of the plot was being cultivated and the price for the plot was paid. The national lands with the following characteristics were excluded from the stipulations of the law: (a) reserved for compensating those affected by the ejidal laws, (b) suitable for colonization, and so it could be acquired free by those lacking land and financial capital, provided the lands were not close to any city, coast or navigable river, and which could be obtained freely if cultivated during three consecutive years [Mendieta y Nunez, 1964, pp. 465-470]. In 1932 the Law of New Centers of Agricultural Population was approved. It stipulated that the government could establish new centers to care for residents of villages who could not expropriate land enough for subsistence within a radius of 7 kms. Each colonist could purchase through subsidy from 3 to 25 hectares, if he could cultivate it with his own and his family labor, but in no case could hired labor be used, nor could the land be rented to other persons [Foreman, 1950, p. 72].

In December 1946, President Aleman, consistent with the

policy of bringing more agricultural areas into cultivation, promulgated the Law of Colonization. This law created a National Commission of Colonization, which was given broad powers to promote the colonization of agricultural lands. The Commission was provided with the authority to stipulate the size of the farm that could be sold to each colonist, but this size was to remain within the limits established by the agrarian reform laws (i.e., minimum size could not be smaller than the minimum size of the ejidal parcel and maximum size could be no larger than the small private properties exempted from expropriation procedures in Article 27 of the Constitution). The colonist was to pay the price of the land in a period of 10 to 25 years [Mendieta y Nunez, 1964, pp. 396-402].

In 1952, Adolfo Ruiz Cortines became President of Mexico. He continued the policies of his two immediate predecessors. During his regime, even less land was distributed than in each of the previous regimes since Cardenas--less than 4 millions hectares were distributed in this period. Some observers of Mexican agriculture have affirmed that one factor accounting for the decline in land distribution was the scarcity of acceptable land [Senior, 1958, p. 26]. This idea was based on the estimates of Mexican geography--two-thirds mountainous, only 10 percent arable and of this only 7 percent could be cultivated without irrigation.²¹

²¹Data from [Gomez, 1950, p. 35] and [Gill, 1951, p. 21].

But those observers of Mexican agriculture were incorrect in their views, and they were to be proved so by the next president of Mexico, Adolfo Lopez Mateos. During his presidential period, Lopez Mateos distributed 16 million hectares, more than any other president of Mexico, with the exception of Lazaro Cardenas.

President Lopez Mateos was, as Cardenas had been, concerned with both the social and the economic aspects of agriculture. He called his approach Integral Agrarian Reform. "For us, the agrarian reform is a social reform that implies the transformation of man himself and not only the re-vindication of his rights to the land or the partial realization of a distributive justice" [Fernandez Bravo, 1964, p. 48]. Its objective was not only to increase the agricultural production but to improve the distribution of the product of the land and to these objectives raise the real income of the peasant families. To accomplish these objectives Lopez Mateos decided to solve the problems of the ejidatarios and those of the small property owner together with the social and economic problems of the rest of the nation. The ejidos were to be provided with land, credit, technical advice and irrigation facilities as soon as the land was given to them; and agricultural products were to be processed in or near the ejidos where possible [Manzanilla Schaffer, 1964, p. 67].

The colonization program for Lopez Mateos was to be a complement of the land reform program through which the problem

of the peasants without land could be solved. Thus, in 1963 he revoked the Federal Law of Colonization, in force since 1946, which favored private ownership and private enterprise in colonization matters. Speculators had taken advantage of the provisions of that law through several subterfuges. The 1963 decree that revoked this law also stated that new settlements in the future were to be planned and executed by the Department of Agrarian Affairs and Colonization. This provision gave preference to ejidos and provided for comprehensive government planning in the new settlements [Siemens, 1966, pp. 23-26].

Diaz Ordaz, who became President in 1964, continued the approach of Lopez Mateos; he recognized that "...the problem of the land is the gravest of all political, social or economic problems confronted by Mexico in present times" [Fernandez Bravo, 1964, p. 21].

Since 1942, when the Agrarian Code of 1942 was approved, the basic legislation in agrarian matters has remained unchanged. In this chapter the legal aspects of the agrarian reform were described. It does not follow necessarily that the application of the law followed strictly according to the letter of the law. The legislation was deficient and inconsistent in many aspects. These deficiencies and inconsistencies gave rise to corruption and malpractices in the implementation of the programs.

CHAPTER V

ECONOMIC EFFECTS OF AGRARIAN REFORM AND OTHER PROGRAMS

The hypothesis here is that the government policies and programs affected output by means of their effects on inputs. Thus, the analysis is divided into different periods that coincide with major changes in programs. One of the difficulties in identifying the appropriate periods is the matter of lags between the time actions are taken and the time the results appear. The time periods are based on the selected materials presented in the preceding chapters and coincide with the times of the actions; the matter of lags is considered in the analysis and in the discussion of the results.

The different periods and the basis for their delineation are as follow:

- (a) Prior to 1911; before the Revolution.
- (b) 1911 to 1917; the more intensive Revolutionary period.
- (c) 1918 to 1934; the Constitution of 1917 to Cardenas.
- (d) 1935 to 1940; the extensive land distribution program.
- (e) 1941 to 1958; emphasis on expansion of irrigation and improvements in institutional operations.
- (f) 1959 to date; integration of land tenure reform and rural services.

However, before the analysis of developments in these periods is made, a description of the major classes of inputs is needed.

Qualifications in the Measurement of Inputs

Land

Although the main physical characteristics of the Mexican soil and climatic conditions were described earlier, certain details merit further attention at this point. The land of Mexico is by no means a homogeneous factor. Thus, changes in the area of land used is not expected to produce proportionate effects on output. Mexico is quite mountainous and nearly two-thirds of the land rests on slopes in excess of 10 percent---slopes in excess of those generally recommended for crop or livestock production without the need for expensive protective works (Table 3). Two mountainous chains, one on each side of the country, are high and long, and additional shorter chains reach from the Pacific Ocean to the Atlantic Ocean. The plain and lowlands are confined to narrow zones along the coasts and the Yucatan peninsula. Between the chains of mountains there are plateaus, and most of the agriculture is confined to these plateaus and the coastal areas. Soil erosion is a serious problem, especially in the Center Zone where a high population density is growing crops on the mountain sides.

Several studies of climatic conditions have been made.

Table 3. Lands Classified According to Slope, Mexico

Slopes	Area in Million Hectares	Percent
Less than 10 percent	70.8	35.4
Between 10 and 25 percent	70.8	35.4
Over 25 percent	<u>58.4</u>	<u>29.2</u>
Total	200.0	100.0

Source: Tamayo, Jorge L., "Influencia de Las Condiciones Fisiograficas de Mexico en su Desarrollo Economico," Investigacion Economica, Vol. 15, No. 3 (May-June 1955), pp. 363-381.

A study made in 1947 classified the Mexican countryside into four categories as follows:

- (a) Arid lands--those receiving less than 250 mm. of annual rain, and irrigation is indispensable for any type of crop.
- (b) Semi-arid lands--those receiving between 250 and 500 mm. of annual rain; suitable for seasonal crops but subject to a high probability of crop loss due to lack of rain.
- (c) Semi-humid lands--those receiving between 500 and 1,000 mm. of annual rain; suitable for seasonal crops with a high probability that crop production will be successful.
- (d) Humid lands--those receiving over 1,000 mm. of annual rain; on these lands it is possible to grow crops every year without irrigation; but where the yearly rainfall is over 2,000 mm. flood control may be required.

According to the above classification, arid and semi-arid lands account for 84.1 percent of the total land (Table 4). Mexican streams are also erratic and turbulent as they descend rapidly from the mountains to the sea.

Another classification of land, made in 1962, reported results similar to those presented above. In this classification, very arid, arid, and semi-arid lands accounted for 76.9 percent of the total land area (Table 5).

Table 4. Climatic Classification of Lands, Mexico

Land Class	Area (1,000 km. ²)	Percent
Arid	1,026	52.2
Semi-arid	627	31.9
Humid	261	13.3
Very humid	<u>51</u>	<u>2.6</u>
Total	1,965	100.0

Source: Oribe Alba, Alfonso, La Política de Irrigación en México. (Mexico, D.F.: Fondo de Cultura Económica, 1960) p.5.

Table 5. Land Classified According to Average Annual Rainfall, Mexico

Average Annual Rainfall	Area (1,000 ha.)	Percent
Less than 300 mm. (Very arid)	46,370	23.6
300-500 mm. (Arid)	39,580	20.1
500-1,000 mm. (Semi-arid)	65,290	33.2
1,000-1,500 mm. (Semi-humid)	30,260	15.4
1,500-2,000 mm. (Humid)	10,190	5.2
Over 2,000 mm. (Very humid)	<u>4,810</u>	<u>2.5</u>
Total	196,500	100.0

Source: Castillos, Cesar A., "Aprovechamiento de los Recursos Naturales, Suelo y Agua." Revista de Economia, Vol. 25, No. 8 (August 1962).

Oribe Alba, based on a study made in 1958, reported the necessity of irrigation as related to moisture requirements in Mexican lands in the following way: if 500 mm. of additional moisture were needed, irrigation was deemed indispensable for crop production; if 200 mm. were needed, irrigation would be necessary; if between 100 and 200 mm. were needed, irrigation would be convenient; and if less than 100 mm. of additional moisture were needed, irrigation would not be necessary. Based on these specifications, Oribe estimated irrigation needs as given in Table 6. Thus, irrigation was considered to be convenient and unnecessary on only 6.0 percent of the lands. It should be noted, however, that these classifications of land, with respect to irrigation requirements, do not take into account the differences in water requirements among uses nor the differences in the time pattern of the rainfall.

The Agricultural Census classification of land since 1930¹ has been based on climate. Land has been classified as (a) crop (tillable) land---irrigated, humid or seasonal, (b) pastures---plains or mountains, (c) forests---with wood or non-wood trees, (d) productive but uncultivated lands, and (e) agriculturally unproductive lands. Official definitions

¹The Agricultural Censuses reported to date are for 1930, 1940, 1950, 1960. Another census was taken in 1970, but results are not expected to be available until the middle of the 1970's.

Table 6. Irrigation Needs of Mexican Soils

Nature of Need	Area (million ha.)	Percent
Indispensable	123	62.8
Necessary	61	31.2
Convenient	9	4.5
Unnecessary	<u>3</u>	<u>1.5</u>
Total	196	100.0

Source: Oribe Alba, Alfonso, "Las Obras de Irrigacion,"
 Mexico: 50 Anos de Revolucion, Vol. 1, Economia,
 (Mexico, D.F.: Fondo de Cultura Economica, 1960),
 p. 337.

of these classifications, according to the Censuses, are as follows: Irrigated lands are those that have water available through man-made means for the growth of crops. Seasonal lands are those that undoubtedly need additional water to supplement rainfall for the growing of crops. Humid lands are those that receive sufficient natural rainfall for the growing of crops. Crop lands are the sum of the seasonal, humid and irrigated lands, and the areas that have physical qualities that make them suitable for seeding, growing and harvesting crops by means of established agricultural works. Pasture lands are those that are almost exclusively used for livestock purposes. Uncultivated but productive lands are those covered by plants that provide fruits without being cultivated. Agriculturally unproductive lands are those occupied by water, swamps, constructions, etc., i.e., all types of lands that are not suitable for agricultural purposes, whether this condition is due to natural or to man-made features.

The 1960 Census, which covers 169 million of the 197 million hectares, classified as cropland 14.1 percent of the area reported--2.1 percent irrigated lands, 0.5 percent humid lands and 11.5 percent as seasonal lands. Pastures covered 46.8 percent of the land reported--19.5 percent in plains and 27.3 percent in mountains. Forests covered 25.8 percent of the area reported. The remainder was uncultivated land--6.6 percent uncultivated but productive and 6.7 percent

agriculturally unproductive lands (Table 7).

Cultivated land reported in the Censuses increased substantially from 1940 to 1950 and from 1950 to 1960, about five million hectares in the first period and almost four million hectares in the second one. Irrigated land increased also. However, irrigation was actually used on only 2.5 million hectares of the 3.5 million hectares on which irrigation facilities were available in 1960 (Table 8). An interesting observation is that between 1930 and 1940, the area of agriculturally unproductive lands was reduced by nearly 10 million hectares at the same time that the 1940 Census reported five million more hectares in productive non-cultivated as well as 12 million more hectares in forest areas. It may be that some of these lands were classified incorrectly in 1930.

In 1960, although the harvested area amounted to 10.4 million hectares, more than one-tenth or 1.7 million hectares were reported to have incurred crop failures. Thus, in 1960, cultivated land and harvested land amounted to only 58 percent and 44 percent, respectively, of total cropland.

In summary, with respect to land, there are two important considerations, namely, the land area used and the area that is improved, especially by means of irrigation.

Table 7. Classification of Land, Mexico, Census Years 1930 to 1960

Class	Years			
	1930	1940	1950	1960
-----1,000 hectares-----				
Cultivated land ^a	14,479	14,871	19,928	23,817
Irrigated ^b	1,677	1,899	2,504	3,515
Humid	1,304	965	842	893
Seasonal	11,497	12,007	16,583	19,408
Pastures	66,493	56,172	67,379	79,092
Plains	31,275	24,470	28,087	33,016
Mountains	35,218	31,703	39,292	46,076
Forest	25,856	38,115	38,836	43,679
With woods	-	15,614	14,277	18,639
Without woods	-	22,501	24,558	25,039
Productive but uncultivated	3,935	8,781	7,777	11,193
Agriculturally unproductive	20,694	10,810	11,596	11,304
Total	131,494	128,749	145,517	169,084

^aAlmost 39,200 hectares of cultivated land were not specifically classified as either irrigated, humid or seasonal.

^bIrrigated means that this land is covered by a system of irrigation, but it does not mean necessarily that it was irrigated during that period.

Source: Censo Agrícola, Ganadero y Ejidal. Several years.

Table 8. Classification of Cropland, Mexico, Census Years 1930 to 1960

Class	Years			
	1930	1940	1950	
	1,000 ha.	1,000 ha.	1,000 ha.	percent
Cropland Total	14,519	14,871	19,928	100
Irrigated	1,693	1,899	2,584	13
Humid	1,304	965	841	4
Seasonal	11,522	12,007	16,503	83
Cultivated	7,165	9,657	10,863	55
Harvested	5,792	6,730	8,573	43
Actually irrigated ^a	-	-	-	-
Change During Decade				
Cropland Total	-	352	5,057	34
Irrigated	-	206	605	36
Humid	-	-339	-124	113
Seasonal	-	485	4,576	37
Cultivated	-	2,492	1,206	12
Harvested	-	938	1,843	27

Table 3. Continued.

Class	1960	
	<u>1,000 ha.</u>	<u>percent</u>
Cropland Total	23,816	100
Irrigated	3,515	15
Humid	893	3
Seasonal	19,408	82
Cultivated	13,783	58
Harvested	10,375	44
Actually irrigated ^a	2,475	10
Change During Decade		
Cropland Total	3,888	20
Irrigated	1,011	36
Humid	52	6
Seasonal	2,825	18
Cultivated	2,920	27
Harvested	1,802	21

^aNot available before 1960.

Source: Censo Agrícola, Ganadero y Ejidal, Several years.

Labor

In most cases, the knowledge of the labor input at best is limited to estimates of the number of persons available. Undoubtedly, there were wide differences between numbers of persons available and the amount of work accomplished. Moreover, labor is not a homogeneous factor. Effects on output are expected to vary according to type of work, work skills, and managerial and entrepreneurial capabilities. These conditioning features cannot be accounted for in very accurate terms.

Capital

Capital is a very heterogeneous factor also. Financial inputs, including credit, are an indirect measure of the physical capital inputs, but in many cases the financial data may be a very inaccurate measure of the effective physical inputs.

Capital also includes the improvements in the infrastructure, such as roads, marketing facilities, and educational services, as well as the implements, machinery, buildings, fertilizers, seeds, and other inputs that are applied directly on the farms.

The financial resources and the direct and indirect capital inputs may be affected by the governmental programs.

Preceding the Revolution (October 1910)

The analysis of the period up to the outbreak of the Revolution is in a highly summarized form for several reasons. The main interest in this study was in the periods after the Revolution; data are scarce; it was a period of relatively homogeneous policies with respect to agriculture. Preceding the Revolution there was a highly authoritarian approach devoted to the protection of the hacienda system, to the inflow of foreign capital for the development of mining, railroads, and plantation agriculture for export commodities, and otherwise to the neglect of agriculture.

From 1900 to 1909, the last decade of the government of Porfirio Diaz and the "cientificos"² (the scientists), the average rate of growth of crop production was 6.1 percent (Table 9).³ Livestock production increased in 1903

²The "cientificos" was the name assigned to the group of Diaz' counselors who held a positivist view in life. They were considered addicted to Malinchismo--the name associated with Malinche, Cortes' Indian mistress who betrayed her own people. Malinchismo implied uncritical acceptance of European and U.S. ways of doing things without a realistic consideration of the actual conditions prevailing in Mexico.

³Some authors do not accept the data from which this rate was computed. The data show high peaks in 1907 and 1909 and were based on data published by [Angulo, 1946, p. 19]. The data are considered to be of questionable accuracy; but all other available data are questionable also. The Angulo data show that immediately after the Revolution the crop production fell in relation to previous prerevolutionary levels; that may be why authors, who tried to deny that the crop production fell in the period immediately after the Revolution, attacked also the Angulo's prerevolutionary data. For a review of Angulo's data, see [Dovring, 1970a, p. 266].

Table 9. Agricultural Production, Mexico, 1900-1910

Year	Livestock			Crops		
	GDP Mil. Pesosa	Index	% Change from Preceding Year	Index ^b	% Change from Preceding Year	
1900	1,335	100.0	-	100.0	-	-
1901	1,361	101.9	1.9	109.0	9.0	9.0
1902	1,361	101.9	0.0	90.7	-16.8	-16.8
1903	1,419	106.3	4.3	111.4	22.8	22.8
1904	1,511	113.2	6.5	107.3	-3.7	-3.7
1905	1,497	112.1	-1.0	121.5	13.2	13.2
1906	1,470	110.1	-1.8	123.7	5.9	5.9
1907	1,479	110.8	0.6	170.3	32.3	32.3
1908	1,436	111.3	0.5	148.2	-13.0	-13.0
1909	1,495	112.0	0.6	172.8	16.6	16.6
1910	1,501	112.4	0.4	163.1	-5.6	-5.6
Mean	1,447	108.4	1.2	129.4	6.1	6.1

^a In constant 1950 prices.

^b 1900 = 100.0

Sources: For livestock, Banco de Mexico, S.A.; Producto Nacional Bruto, 1967 (Mexico, D.F.: 1968); for crops, Nacional Financiera, S.A.; La Economía Mexicana en Cifras (Mexico, D.F.: Nacional Financiera, S.A.) 1965.

and 1904 and then remained relatively stable. For this same period, Hertford's study [Hertford, 1971, p. 14] shows the compound annual growth rates, in percent, based on gross domestic product by industrial sector, as follows: crops, 3.7; livestock, 1.1; mining, 5.4; petroleum, 34.5; manufacturing, 2.9; transportation and communication, 2.8; other, 3.3; and total GDP, 3.3. The estimate of population growth rate was 1.1 percent. This rate of growth in the Porfirian regime is attributed to the inflow of foreign capital which had been entering Mexico since 1880. This inflow of capital was concentrated in specific sectors--mining, railroads, and the plantation⁴ type of agriculture for the purpose of producing for export. The emphasis of Diaz' government was on economic overhead capital, while the other component of infrastructure, the social overhead capital, was neglected. During 1867-1877, seven rail lines were projected to unite the Northern areas with the Capital.

The most important of these, and the first to be completed (1884), went from Mexico City through the commercial center of the present-day Comarca Lagunera agricultural region to Ciudad Juarez on the border. Rapid settlement of the North followed [Hertford, 1971, p. 4].

The large hacienda dominated rural Mexico, but since the 1880's the commercial plantation, mainly in the North,

⁴The plantation differed from the typical hacienda in that it had a higher degree of capitalization and organization. Labor was strictly controlled and, in general, production was mainly for the export markets.

was also present in the rural scene--with most of it controlled by foreign owners. Foreigners controlled more than one-fifth of the privately held land as well as about one-half of the total national wealth. Absentee ownership was common. Despite its capacity for growth in agricultural output, the rural social conditions were unbearable and unchanging--consequently the Revolution was started.

To accelerate the development of irrigation works, the Porfirio Diaz government gave concessions and government subsidies to colonization companies to develop irrigation systems. It was estimated that by 1910 about one million hectares were covered by irrigation works. Most of these lands were located in the areas of commercial plantations that Cardenas later redistributed in the 1930's--areas in La Laguna, Nueva Italia and Lombardia.

1911 to 1917 and 1918 to 1934

These two periods, also, are covered in a highly summarized way, because of the sparseness of the relevant data. The first period includes the years from the outbreak of the Revolution, in October 1910, to the Constitution of 1917. The second period includes the years from 1918, beginning with the 1917 Constitution that provided the major legal basis for land reform, to 1934 which was the year in which Lazaro Cardenas became President and accelerated implementation of the land reform program.

As one would expect, the economy was disrupted during the war period of 1911 to 1917. The information on agricultural inputs for this period is extremely meager. There was a reduction in population, which probably reduced the available labor. The total population reported was 14.3 million in 1921 compared with 15.2 million in 1910 [Nacional Financiera, S.A., 1965, p. 19]. Recruitment of men for the armed forces probably reduced the labor input in agriculture even more than the effects of the decline in population. In addition to the drain on manpower, the war undoubtedly disrupted the transportation, financial and marketing services. Data for the land and capital inputs are not available. The annual index of crop production (1900=100) varied widely--between a low of 105.7 in 1911 and a high of 196.1 in 1913 (Table 10).⁵ While there was an average annual increase of 1.7 percent, no significance should be attached to this change in view of the 76.2 percent increase in one year, 1913 over 1912.

⁵The set of data for this period is based on H.G. Angulo, "Indice de la Productividad Agricola" [Angulo, 1946]. As pointed out in a previous footnote there has been some controversy about these data since they indicate that there was disruption caused by the war. Some authors, it appears, engaged in a dogmatic effort to defend the Revolution in all respects and argued that agricultural output did not fall in this period. Some authors argue that Angulo's figures reflect an index in which corn and beans were heavily weighted, both of which fell in production for that period, not due to the Revolution, but due to a pre-existing trend. For this argument, see [German Parra, Manuel, 1954, pp. 128-132].

Table 10. Index of Crop Production, Mexico, 1910-1934

Year	Index ^a	% Change from Preceding Year
1910	163.1	--
1911	105.7	-35.2
1912	111.3	5.3
1913	196.1	76.2
1914	116.0	-40.8
1915	124.3	7.2
1916	145.8	17.3
1917	119.5	-18.0
Mean	135.2	1.7
1918	91.5	-23.4
1919	139.6	52.6
1920	99.7	-28.6
1921	82.8	-17.0
1922	98.1	18.5
1923	112.2	14.4
1924	116.5	3.8
1925	124.5	6.9
1926	141.8	13.9
1927	132.6	-6.5
1928	138.8	4.7
1929	113.9	-17.9
1930	104.7	-8.1
1931	132.0	26.1
1932	115.2	-12.7
1933	128.9	11.9
1934	114.4	-11.2
Mean	116.9	1.6

^a 1900 = 100

Source: Nacional Financiera, S.A., La Economía Mexicana en Cifras. (Mexico, D.F.: Nacional Financiera, S.A. 1965).

With the exception of 1919, the index of crop production declined each year from 1917 to 1922; afterward there was a recovery but the average 5-year indexes of 125.5 in 1923-1927 and 120.9 in 1928-1932 were still below the 1900-1910 index of 129.4 (See Tables 9 and 10). The aftermath of the War and the uncertainty surrounding land reform were expected to have adverse effects for some years after 1917.

There was a 15.5 percent increase in population from 1921 to 1930, and the foundations for other changes in agriculture were being established. The revolutionary governments were concerned with the extension of irrigation, but it was not until 1926 that the National Irrigation Commission (Comision Nacional de Irrigacion) was established. By that time, the private sector had irrigated about 1.5 million hectares, an area that has remained constant up to the present time while the government-irrigated areas have increased to over two million hectares. The following percentages of total Federal expenditures were spent on irrigation in 1930 through 1934, respectively: 3.7 percent, 2.0 percent, 2.6 percent, 6.7 percent and 3.1 percent [Oribe Alba, 1960, p. 196]. One source [Wilkie, 1967, p. 198] reported 149 thousand hectares of lands irrigated by governmental projects during the presidential periods of Calles through Rodriguez, 1928-1934. According to the Nacional Financiera [Nacional Financiera, S.A., 1965], between 1926 and 1934, new irrigation was added to 84 thousand

hectares and improvements in irrigation were made on 65 thousand hectares. While the area affected was a very small fraction of the total farm area, there was evidence of the beginning of a public program to improve the farm lands.

The 1917 Constitution provided the legal basis for land reform. While the legal basis might be considered necessary, it did not insure rapid implementation. The extent of implementation is indicated in the following summary, taken from Table 2 which was presented previously:

<u>President</u>	<u>Period</u>	<u>1,000 Hectares Distributed to Ejidos</u>
Carranza, V.	1915-20	224
Huerta, A. de la	May-Nov. 1920	158
Obregon, A.	1920-24	1,677
Elias Calles, P.	1924-28	3,195
Portes Gil, E.	1928-30	2,066
Ortiz Rubio, P.	1930-32	1,204
Rodriguez, A.	1932-34	<u>2,095</u>
Total		10,619

According to Hertford [1971, p. 37; original source was Departamento de Asuntos Agrarios, Memorias de Labores, All Issues, Mexico] there were 7.7 million hectares distributed to the benefit of 803 thousand persons; only restitutions, "dotaciones" and amplifications are included. However, to what extent this distribution of land to ejidos contributed to a net addition to the area of land used for farming and to the intensification of land use--a shift from pastures to crops, for example--is not known. This was also the period in which foundations were being laid for the formulation of

other agricultural institutions--education, research, and credit.

Annual data for six major crops, 1925-1934, were available (Table 11). Formal statistical tests for trends in area and production of these crops did not appear to be justified at this point. However, an inspection of the data indicates that there was an increase in corn acreage, a decrease in acreage of beans, and a net increase in the total acreage of the crops--accounted for by the increase in corn acreage which exceeded the decrease in bean acreage.

Livestock production recovered from below the 1900 level and reached a peak in 1925 (Table 12). After the recovery following the Revolution, there was no evidence of sustained growth.

Periods after 1935

With the rise to the presidency of General Lazaro Cardenas near the end of 1934, a period of political and social stability, which has prevailed up to the present time, was initiated in Mexico. The political and social stability in the country initially permitted the recovery and later the growth of the Mexican economy. The growth was particularly significant in the agricultural sector. The index of crop production increased at an average annual rate of 5.51 percent from 1935 to 1964 and 3.92 percent from 1959 to 1970. For the same periods, livestock production increased less rapidly, at average annual rates of 3.43 percent and 3.20 percent, respectively (Table 13).

Table 11. Area Harvested, Yield and Production, Principal Crops, Mexico, 1925-1934

Year	Crop				Total
	Corn	Beans	Wheat	Cotton	
	Area, 1,000 hectares				
1925	2,938	924	455	172	95
1926	3,139	964	518	245	99
1927	3,182	959	528	132	101
1928	3,113	890	516	203	104
1929	3,881	672	521	199	100
1930	4,165	693	490	158	98
1931	3,379	742	604	129	97
1932	4,227	691	445	78	94
1933	4,345	744	472	172	104
1934	4,188	697	493	169	100
Mean	3,656	798	504	166	99
	Yield, kilograms per hectare ^a				
1925	670	203	655	253	500
1926	680	207	646	314	505
1927	647	198	729	294	511
1928	698	198	691	297	511
1929	513	129	704	268	509
1930	448	116	756	243	499
1931	663	188	869	353	490
1932	609	206	703	283	47
1933	601	281	830	329	45
1934	580	207	719	286	43
Mean	611	193	730	292	44

Table 11. Continued.

Year	Corn	Beans	Wheat	Cotton	Sugarcane	Coffee	Total
Production, 1,000 metric tons							
1925	1,963	188	298	43	2,373	48	
1926	2,125	199	334	78	3,158	59	
1927	2,059	190	385	39	2,977	52	
1928	2,173	176	357	60	2,947	53	
1929	1,991	87	367	53	3,029	52	
1930	1,866	80	371	38	3,293	49	
1931	2,139	139	525	46	3,694	47	
1932	2,574	142	313	22	3,405	41	
1933	2,612	209	392	56	2,778	55	
1934	2,429	144	354	48	2,774	46	
Mean	2,195	155	370	48	3,093	50	

^aSugarcane yield is in metric tons, not kilograms.

Source: Secretaria de Agricultura y Ganaderia, Direccion General de Economia Agricola, published in *Horcasitas*, Victor M., *Algunos Indicadores del Desarrollo Agricola Mexicano en Los Ultimos 27 Anos y su Cuantificacion.* (Mexico, D.F.: Escuela Nacional de Agricultura, 1967).

Table 12. Gross Domestic Product from Livestock, Mexico, 1921 to 1934

Year	Million Pesos ^a	Index (1900=100) ^b	% Change from Preceding Year
1921	905	67.8	-
1922	1,033	77.4	14.2
1923	1,032	77.3	- 0.1
1924	1,139	85.3	10.3
1925	1,521	113.9	33.5
1926	1,766	132.3	16.2
1927	1,637	122.6	- 7.4
1928	1,734	129.9	6.0
1929	1,573	117.8	- 9.3
1930	1,434	107.4	- 8.8
1931	1,647	123.4	14.9
1932	1,632	122.2	- 1.0
1933	1,617	121.1	- 0.9
1934	1,876	140.5	16.0
Mean	1,468	109.9	6.0

^a In constant 1950 prices.

^b 1900=1,335 million pesos.

Source: Banco de Mexico, S.A., Producto Nacional Bruto, 1967, (Mexico, D.F., 1968).

Table 13. Annual Rates of Growth of Crop and Livestock Production, Mexico, 1935-1970^a

Periods	Crops	Livestock
	percent	
1935-1940	2.97	1.68
1941-1958	6.76	3.94
1959-1964	4.32	3.76
1935-1964	5.51	3.43
1959-1970 ^b	3.92	3.20

^aComputed by regression by use of the following equation for the 1935-1964 period:

$$Y = a + b_1X_1 + b_2X_2$$

where Y = annual rate of growth.

a = intercept - mean rate of growth for 1935-1940.

b_1 = coefficient of X_1 = difference in rate of growth between 1934-1940 and the 1941-1958 periods.

X_1 = dummy variable, 1 for 1941-1958, 0 for the other years.

b_2 = coefficient of X_2 = difference in rate of growth between 1934-1940 and the 1959-1964 periods.

X_2 = dummy variable, 1 for 1959-1964, 0 for the other years.

The results of the equations were:

$$\text{Crops} = 2.97 + 3.79X_1 + 1.35X_2, R^2 = 0.06$$

(2.65) (3.06) (3.75)

$$\text{Livestock} = 1.68 + 2.26X_1 + 2.08X_2, R^2 = 0.10$$

(1.13) (1.30) (1.60)

None of the b coefficients was significantly different from zero, $t=0.05$.

^bRates of growth for period 1959-1970 were computed from a different source of data than for the 1935-1964 period.

Sources: Tables 14, 20 and 30.

The regression analysis for rates of growth for the crop and livestock sectors since 1935, through statistical tests, showed no significant differences in rates of growth among the different periods. However, these results do not discredit the classification into the specified periods since these were based on the differences in policies and programs implemented by the different presidents. In addition, while the regression analysis indicates an overall growth trend, the differences in rates of growth among periods were not significant probably due to the fact that each period consisted of a small number of years and there was a high degree of variance within each period. It must also be kept in mind that the effects of programs in any one period may not appear until the following periods.

For purposes of this analysis the period from 1935 to 1970 was divided into three sub-periods according to the main agricultural policies of the different presidents.⁶ The Cardenas' period of 1935-40 was characterized by an extensive land distribution program. In the period 1941 to 1958 the main presidential emphasis was on irrigation and the consolidation of the social gains obtained in the previous

⁶Statistical tests for differences in agricultural growth rates among these periods were not conclusive (Table 13). See Tables 173 and 174 in the Appendix for estimates of growth rates for individual commodities.

period. In 1959 to 1970 the emphasis was placed on integrating land reform and rural services.

1935 to 1940

The President during this period was General Lazaro Cardenas. Approximately 20 million hectares of land were distributed to ejidos in this period--nearly twice the area distributed by 1970 (See Table 2). During Cardenas' presidential period the average annual rate of change in crop output was 3.0 percent, but the variations ranged from -6.1 percent to 11.2 percent (Table 14). Even so, the year-to-year variations in the Cardenas period were considerably less than those in the immediately preceding six years. There was also an increase in livestock production and a reduction in the year-to-year fluctuations.

During 1935-1940 the area of corn harvested increased from 4.3 million hectares to 5.1 million hectares, but the yields tended to decrease (Table 15). Thus, the annual rate of growth of corn production for the period was only 2.3 percent. The intensification of the land redistribution program not only caused uncertainty and a decrease in private investments in agriculture but it also affected the new beneficiaries of the agrarian reform. Those beneficiaries, in many instances, shifted their land cultivation to corn--the traditional crop; thus the area harvested was increased

Table 14. Agricultural Production, Mexico, Mean 1929-34 and Annually 1935-1940.

Year	Livestock		Crops	
	GDP Mil. ^a Pesos	Index ^b (1900=100)	% Change from Preceding Year	% Change from Preceding Year
Mean 1929-34	1,630	122.1	1.8	118.2
1935	1,975	147.9	5.2	119.8
1936	2,071	155.1	4.8	133.2
1937	2,124	159.1	2.6	125.0
1938	2,087	156.3	-1.7	127.2
1939	2,035	151.7	-2.9	140.6
1940	2,070	155.0	2.1	134.9
Mean 1935-40	2,060	154.3	1.7	130.1
				- 2.0
				4.7
				11.2
				- 6.1
				1.8
				10.5
				- 4.1
				3.0

^aIn constant 1950 prices.

^b1900 = 1,335 million pesos.

Sources: For livestock, Banco de Mexico, S.A. Producto Nacional Bruto, 1967 (Mexico, D.F., 1968); for crops, Nacional Financiera, S.A., La Economía Mexicana en Cifras (Mexico, D.F.: Nacional Financiera, S.A., 1965).

Table 15. Area Harvested, Yield and Production, Principal Crops, Mexico, 1935-1940

Year	Corn	Beans	Wheat	Cotton	Cane	Coffee	Total
-----Area, 1,000 hectares-----							
Mean 1929-34	4,031	706	504	151	71	99	5,487
1935	4,329	684	460	266	72	105	5,916
1936	4,310	655	508	343	76	123	6,015
1937	4,683	695	484	336	92	119	6,409
1938	4,993	834	501	260	87	122	6,797
1939	4,941	841	563	262	94	120	6,821
1940	5,080	845	601	254	98	116	6,994
Mean 1935-40	4,772	756	520	287	87	118	6,490
-----Yield, kilograms per hectare ^a -----							
Mean 1929-34	569	188	764	294	44	487	
1935	565	213	753	257	47	498	
1936	560	202	864	251	47	516	
1937	545	190	708	220	47	501	
1938	547	177	771	256	47	464	
1939	605	234	761	258	49	459	
1940	491	152	772	258	51	451	
Mean 1935-40	552	195	772	250	48	482	
-----Production, 1,000 metric tons-----							
Mean 1929-34	2,268	134	387	44	3,162	48	
1935	2,446	146	347	68	3,573	52	
1936	2,414	132	439	86	4,341	63	
1937	2,552	132	342	74	4,056	60	
1938	2,731	148	386	66	4,132	57	
1939	2,989	197	429	68	4,556	55	
1940	2,494	128	464	65	4,973	52	
Mean 1935-40	2,604	147	401	71	4,272	57	
-----percent-----							
Growth rate, 1935-40	2.23	1.89	4.39	-8.02	5.32	-1.32	

Table 15. Continued.

^aSugarcane yield is in metric tons, not kilograms.

Source: Secretaria de Agricultura y Ganaderia. Direccion General de Economia Agricola, published in Horcasitas, Victor M., Algunos Indicadores del Desarrollo Agricola Mexicano en los Ultimos 27 Anos y su Cuantificacion (Mexico, D.F.: Escuela Nacional de Agricultura, 1967).

but the lack of needed complementary inputs results in lower yields on these additional areas in comparison with other areas. Another reason for the low yields is that in many cases the Indian of the low tropical lands almost never used the plough. Indians used the neolithic "coamil," with one to four continued plantings, and later abandoned the small plot and allowed it to fallow for a while. As the population density increased, the fallow period was reduced, and with it, the yields.

The area of beans harvested increased from 684 thousand hectares to 845 thousand hectares. But the yields fluctuated rather widely and so did production. There is an association between the increase in the area of corn and the area of beans grown since in many instances they are intermixed.

For each crop the mean area harvested and production were larger than the respective means for the immediately preceding six-year period, but yields for corn and cotton were lower.

While the crop sector was increasing at an annual rate of nearly 3 percent during the Cardenas period, the livestock sector was growing at only 1.6 percent per annum. When Cardenas took power the situation in the livestock sector was discouraging.

The livestock population of Mexico in 1902 consisted of 13.8 million large animals (bovine, horses, mules, asses) and 10.1 million small animals (hogs, sheep, goats). By

1930, after the peak of the Revolutionary War years had passed, the population of large animals was only 14.9 million heads. Although there was an increase of one million heads in total, the number of cattle decreased from 10.3 million to 10.1 million. Small animals showed an increase of almost 30 percent (Table 16). During the Revolutionary War, animals were affected more seriously than crops, as cattle were killed to support the different armies.

Also, the livestock sector, which requires several years to develop, was undoubtedly affected by the uncertainties of the agrarian reform program. By the early 1930's the GDP obtained from the livestock sector in constant 1950 pesos was about equal to the level obtained from the same sector in 1910. The Cardenas administration attempted to improve this situation by providing the livestock sector with greater security by means of certificates of unaffectability for the livestock sector from agrarian reform disruptions for 25 years.

In addition to an accelerated land distribution program, other government programs included irrigation, credit, a highway network, stabilization of agricultural prices, and nationalistic ideals, and in order to reduce tenure uncertainty legislation stipulated that the haciendas could retain 150 and 500 hectares under the agrarian reform program---

Table 16. Livestock Population, Mexico, Selected Years, 1902 to 1964

Category	Years					
	1902	1930	1940	1950	1960	1964
-----1,000 head-----						
<u>Large Animals</u>	13,822	14,881	17,357	23,601	24,851	37,241
Bovine	10,284	10,083	11,591	15,713	17,669	26,838
Horses	1,718	1,887	2,509	3,781	3,463	5,785
Mules	688	751	938	1,539	1,507	3,146
Asses	1,152	2,160	2,319	2,768	2,208	3,672
<u>Small Animals</u>	10,148	13,196	16,402	20,504	20,889	25,028
Hogs	2,464	3,698	5,106	6,896	5,988	9,325
Sheep	3,424	3,674	4,452	5,086	5,169	6,513
Goats	4,260	6,544	6,844	8,522	9,732	9,190

Source: Nacional Financiera, S.A. La Economía Mexicana en Cifras, (Mexico, D.F.: Nacional Financiera, S.A., 1965), p. 63.

the area was to depend on the type of crop.⁷

The percentages of total federal expenditures spent on irrigation investments were increased substantially (Table 17). For the 1935-40 period, total investments in the public sector were 947 million pesos and 16.8 percent was spent for irrigation works (Table 18).

Credit is an important element in agriculture as a means of obtaining the needed inputs and, in many cases, to provide consumption support to the farmer and his family between harvests. In general, because of higher risks in farming, private banking gives first priority to supplying the demands of the commercial sector, where the length of terms is short, the interest rates attractive, and the risks at a minimum. Second priority is given to the demands of the industrial sector, and agriculture tends to be at the bottom of the priorities. Thus in the development process, generally, private credit in agriculture is not sufficient to meet the demands.

Before the establishment of the government sources of credit in Mexico, the farmers had to obtain credit from private individuals. Even after the establishment of the national banks many farmers had to depend on credit from

⁷The "hacendados" (hacienda owners) were given the right to choose the hectares they could keep; obviously they chose the ones with better soil and those which included the productive fixed assets of the latifundio--such as buildings, and water systems.

Table 17. Investment in Irrigation by Federal Government as Percentage of Total Federal Expenditure, Mexico, 1930 to 1958.

Year	Percent	Year	Percent	Year	Percent
1930	3.7	1940	6.8	1950	13.1
1931	2.0	1941	10.9	1951	13.6
1932	2.6	1942	10.9	1952	13.7
1933	6.7	1943	11.4	1953	13.8
1934	3.1	1944	10.6	1954	12.8
1935	3.8	1945	13.9	1955	11.3
1936	7.9	1946	15.7	1956	9.0
1937	8.8	1947	13.1	1957	8.5
1938	6.6	1948	10.4	1958	7.8
1939	12.2	1949	9.8		

Source: Oribe Alba, Alfonso, La Política de Irrigación en México, (Mexico, D.F., Fondo de Cultura Económica, 1960), p. 196.

Table 18. Public Investment, by Sector, Mexico, Selected Periods from 1935 to 1963

Category	Years				
	1935-40	1941-46	1947-52	1953-58	1959-63
	percent				
<u>Agricultural</u>	17.8	15.7	22.0	13.0	8.9
Irrigation	16.8	15.0	16.2	12.2	8.5
Other	1.0	.7	5.8	.8	.4
<u>Industrial</u>	9.3	10.2	18.9	30.3	35.3
<u>Commerce &</u>					
Transportation	51.4	51.6	40.2	36.3	30.2
Roads	18.9	23.3	16.0	14.7	11.9
Railroads	29.4	26.0	21.3	16.0	11.4
Other	3.1	2.3	2.9	5.7	6.8
<u>Social</u>	8.3	12.9	13.3	14.3	21.3
Public Housing	-	-	1.5	1.5	4.9
Hospitals	.7	1.5	1.5	1.5	4.8
School & Research					
Facilities	2.4	1.2	3.0	2.5	2.5
Other	5.2	10.2	7.3	8.7	9.1
Miscellaneous	13.3	9.5	5.6	6.1	4.2
	million pesos				
Total	947	4,309	14,091	26,674	50,729

Source: Hertford, Reed, Sources of Change in Mexican Agricultural Production, 1940-1965 (Washington, D.C.: U.S.D.A., 1971), p. 6.

individuals. Individuals provided the funds through the procedure called "habilitaciones," or "compras al tiempo," that is, creditors bought the crops from the farmers at prefixed low prices and the credit was granted at exorbitant rates.

No action was taken by the government until President Calles established a special bank in March, 1926, the Banco Nacional de Credito Agricola (BNCA--National Bank of Agricultural Credit). The main purposes of this bank were to supply the needed credit to agriculture and, at the same time, to create conditions that would induce private funds into the agricultural sector. The BNCA was to be founded by the selling of stocks to federal, state and local governments, and to private banks and individuals. But investors did not buy the stocks and, consequently, the federal government supplied almost all of the bank's capital.

Credit was to be made available through several types of loans: "avio", extended up to 18 months for the purpose of financing short-term crop production expenses; "refaccionario", for the purpose of machinery and implements used in production, generally extended for a period of 1 to 5 years; "inmobiliario", for the purpose of making permanent capital improvements, extended for a 5-year period. In addition to lending money to the farmers in the above mentioned forms, BNCA had another responsibility. In order to handle the

administrative aspects of credit, local societies with cooperative characteristics were to be formed among the clients of the bank. The first article of the law creating the BNCA stated "...to organize and promote the agricultural credit in the Republic, the Banco Nacional de Credito Agricola is established and therefore authorized the organization and functioning of local and regional societies of credit and similar institutions..." [Gomez Marin, 1928, p. 261]. The BNCA was responsible for the development, regulation and supervision of the organization and functioning of the local and regional credit societies.

The BNCA was authorized to lend without the security of mortgages or other real estate guarantees. The purpose of this stipulation was to make it possible for the Bank to serve the ejidatarios who did not own their land. The only guarantee that the ejidatarios could offer, and that the BNCA was authorized to accept, was their future harvests. In reality, in most cases, the BNCA followed the practices of the private banks, and was reluctant to lend money to the small farmers and particularly to the ejidos. In 1930, the ejidatarios, while they comprised 70 percent of the individuals served by the BNCA, received only 14 percent of the total credit extended. The large property owners, on the other hand, received 74 percent of the credit extended,

while the small landowners received the remaining 12 percent⁸ (Table 19).

Among the reasons given by the BNCA for refusing loans to ejidos was the lack of collateral, except the harvest, from the ejidatarios. This lack of security and the high rate of unpaid loans made the BNCA reluctant to favor the ejidal loans.

When President Cardenas came into power in 1934 he recognized the essential role of credit in the expansion of ejidos in a way that would permit them to provide a significant share of the agricultural production. The BNCA, with its conventional banking practices, had not reconciled itself to the needs and conditions of the ejidos. Instead of requiring the BNCA to adjust its policies to the needs of the ejido, Cardenas used the principle that in order to separate the present from past failures, new policies needed new institutions. Therefore, in 1935, he established the Banco Nacional de Credito Ejidal (BNCE--National Bank of Ejidal Credit), to provide credit for the ejidos. In order to help in the administration of credit, both banks worked through local societies or credit cooperatives and had regional banks to distribute the credit.

⁸In 1926-31, of an average annual authorized credit of 57,855 million pesos by the BNCA, less than 10 percent or 5,334 million pesos were ejidos loans [Secretaria de Gobernacion, 1940, pp. 70-71].

Table 19. Banco Nacional Credito Agricola y Ganadero (National Bank of Agricultural Credit), Credit Operations, 1930

Type of Debtor	Number of Individuals Served	Percent of Total Individuals Served	Percent of Total Credit
Ejidos	27,499 ^a	69.5	13.8
Small private farms	10,589	26.7	11.8
Large private farms	<u>1,491</u>	<u>3.8</u>	<u>74.4</u>
Total	39,579	100.0	100.0

^aServed through 432 local credit cooperatives, required by law to help in the administration and distribution of bank credit to ejidos and small landholders.

Source: Simpson, Eyler N., The Ejido: Mexico's Way Out. (Chapel Hill: University of North Carolina Press, 1937), pp. 668-669.

The BNCE, in addition to being a credit institution, acted as a development institution. Along with granting loans, it organized the local credit societies of the ejidatarios, executed some works, such as the digging of wells, renting and maintenance of agricultural machinery, supplying the ejidatarios with certain needed inputs such as seeds, assembling and selling the products of the farmers, managing some industrial plants, promoting subsidiary activities and social services for farmers, and supporting agricultural research and extension services. The short-term loans of the bank were to cover the immediate expenses of production of the ejidatarios. Due to the poverty of the ejidatarios, the loans covered not only the costs of such items as fertilizers, seeds, and taxes, but also the implied salaries needed by the ejidatarios to support themselves and their families during the production period. Once the harvest was completed, the bank, to insure the recovery of the loan, would take the harvest and sell it. After deducting the amount of the loan, the balance was passed on to the ejidatario.

The BNCE functions included providing credit to farmers in some areas where the conditions were not favorable for production. In these cases the BNCE provided the credit in order to give the farmers a means of subsistence. This credit was regarded as a subsidy and occurred frequently.

Another important source of credit founded during the Cardenas period was the Banco Nacional de Comercio Exterior

(National Bank of Foreign Trade), founded in 1947, whose objective was to promote exports. This bank did not make direct loans to farmers to promote agricultural exports, but guaranteed loans to the regional bank which made loans to farmers.

Lack of marketing facilities is a problem confronted in the agricultural sector of almost all the underdeveloped countries. Mexico was not an exception. The main beneficiaries of this lack of facilities are the middlemen who are in monopsonistic positions in relation to the farmers--large numbers of small scale producers of perishable commodities--and in monopolistic positions in relation to consumers.

In 1937, the Mexican government took steps to intervene in the situation. That year, the *Comite Regulador del Mercado del Trigo* (Regulation Committee of the Wheat Market) was founded; following the Mexican pragmatic approach which created legal confusion at times, it was replaced by the *Comite Regulador del Mercado de las Subsistencias* (Regulation Committee of the Subsistence Items Market) in 1938 and by the *Nacional Reguladora y Distribuidora* (National Regulation and Distribution) in 1941. Its main objective was to keep prices of basic food items at a level within the reach of the workers' incomes.

Another government agency was ANDSA (*Almacenes Nacionales de Deposito, S.A.*), established in April 1936 with the

objectives of storage and conservation of products. From the credit standpoint, ANDSA issued credit documents for deposit of the agricultural products in their warehouses, which could be discounted at the banking institution. This was an invaluable service for the agricultural producers.

An important effect on production which cannot be quantified was the one related to the change in institutions and attitudes associated with the Revolution. When the Porfirian repression disappeared, a fluid social organization developed with a place for individual initiative.

At the end of the Porfirio Diaz regime (1910) foreigners owned a significant part of Mexican agriculture and of the total Mexican economy; they also tried to impose their values on Mexican society. One of the main values of the new Revolution in 1910 was its nationalistic emphasis on the recovery of the grandeurs of Mexico as they existed in the imperial Indian days. This was a movement to Mexicanize the whole nation and there was an enthusiastic exaltation of Mexico's values. In economic terms this change meant the accomodation and organization of the Mexican economy to the conditions and desires of the Mexican people, not along the lines of the traditional Latin American colonial export economy, which prevailed in the Porfirian days. The foreigners and their allies, the land-owning bourgeoisie, had been the beneficiaries during that stage. Now the emphasis was placed on the development of a better standard of living for the

Mexicans.

Cardenas gave emphasis to this nationalistic objective in the agrarian reform by means of the re-establishment of the ancestral ejidal type of organization in agriculture and by the nationalization of foreign plantations in the northern region which were transformed into collective ejidos. He also nationalized Mexico's petroleum and railroad industries which were in foreign hands and gave Mexico greater independence in pursuing its own foreign policy. These nationalistic policies probably enhanced the pride among Mexicans in being Mexicans.

This revolutionary approach stimulated the desire for work and achievement on the part of the Mexican mestizos and Indians. They had been characterized as lazy, a characteristic attributed to inheritance from their Indian parentage. It was found that this was not an inherited factor; it was cultural and the rational answer and the mechanism of self-defense against generations of oppressions and lack of alternatives. The Revolution brought pride and honor in being of Mexican origin, of having Indian blood, in being a descendant of Moctezuma. Thus indolence and laziness were literally imposed on the Indians; they did not choose them of their own free will. With the Revolution they had a chance to prove it. After the Revolution, the educational system emphasized how their way of life could be changed, and the political campaigns stressed the fact that the

Revolution had opened and widened opportunities for the Mexican masses.

But the effect of the intense land redistribution effort by Cardenas was not restricted to the Mexican masses; it was also felt by the latifundist class. Land by itself was no longer a status symbol, nor after the Revolution was land a means to political power; it had become mainly a means of production. And to obtain economic power as well as a means of subsistence, members of this class had to use wisely and economically the land which was left to them from the previous latifundios. They also were left with their properties in urban real estate which was spared by the Revolution and the value of which multiplied rapidly. The ex-landowner class was transformed into part of the managerial class, who had helped in the industrial development of Mexico. The Revolution, therefore, changed the whole set of rural institutions, mainly after Cardenas revitalized the issues and interest of the rural masses in the late 1930's.

As the standard of living of the Mexican masses improved, the market for agricultural goods increased. Government activities helped to provide inputs to the farm sector encouraging the development of capital. The agricultural sector saw the ejido program as a way of providing the social and political stability needed for development. While the evidence indicates that there were positive effects on output during this period, a large part of the impact from actions

taken during this period' are not expected to materialize until later as a result of the necessary time lags.

1941 to 1958

At the end of 1940, General Avila Camacho took office as president of Mexico. He was to be the last military president of Mexico up to the present time.

Avila Camacho and the two following presidents, Aleman and Ruiz Cortines, basically followed the same policies: to provide security to farmers in their possessions in order to encourage agricultural production and to facilitate the use of additional inputs that would increase the yields, mainly irrigation which would also increase the area under cultivation. Land colonization schemes were also undertaken.

During this period, the index of crop production increased at an average annual rate of 6.8 percent, more than twice the 1935-40 rate (Table 20). Livestock production increased at a slower pace, 3.9 percent, but also more than double the 1935-40 rate. Livestock production decreased in only two of the 18 years and crop production decreased in only four years. Thus the annual variations in production were reduced substantially while growth moved at a relatively high rate in comparison with previous periods.

The main factors that accounted for the increases in area under cultivation were population growth, favorable prices, colonization programs in which new land was cleared

Table 20. Agricultural Production, Mexico, 1941-1958

Year	Livestock			Crops	
	GDP, Mil. Pesos ^a	Index ^b (1900=100)	% Change from Preceding Year	Index (1900=100)	% Change from Preceding Year
1935-40 ^c	2,026	154.3	1.7	130.1	3.0
1941	2,203	165.0	6.4	145.0	7.5
1942	2,218	166.1	0.6	158.9	9.6
1943	2,256	168.9	1.7	154.6	-2.7
1944	2,264	169.6	0.4	160.4	3.7
1945	2,378	178.1	5.0	159.0	-0.9
1946	2,552	191.1	7.3	166.3	4.6
1947	2,526	189.2	-0.9	179.0	7.6
1948	2,758	206.6	9.2	198.0	10.6
1949	2,839	212.6	2.9	217.5	9.8
1950	2,903	217.4	2.2	238.7	9.7
1951	3,105	232.6	6.9	250.9	5.1
1952	3,222	241.3	3.7	241.1	-4.3
1953	3,164	237.3	-0.2	263.5	9.3
1954	3,315	243.3	4.6	320.6	21.6
1955	3,469	259.3	4.6	363.8	12.9
1956	3,603	269.9	3.8	357.3	-1.8
1957	3,893	292.3	8.3	387.9	8.5
1958	4,076	305.3	4.4	429.7	10.8
1941-58 ^c	3,103	232.5	3.9	258.3	6.8

^aIn constant 1950 prices.^b1900 = 1,335.^cMean.

Sources: For livestock, Banco de Mexico, S.A. Producto Nacional Bruto, 1967 (Mexico, D.F.: 1968); for crops, Nacional Financiera, S.A. La Economia Mexicana en Cifras (Mexico, D.F.: Nacional Financiera, S.A., 1965).

--mainly in the Southeast or Gulf regions, especially under Presidents Aleman and Ruiz Cortines' "March to the Sea" colonizations programs--the redistribution of land to the ejidos under the agrarian reform program, and last, but probably first in importance, the irrigation programs and the accompanying complementary inputs. Irrigation programs contributed to yield increases as well as to increases in area cultivated.

"Yield" is a "catch all" measure, expressed in terms of output per unit of land area, that reflects the qualitative conditions of land as well as all other production inputs except the area cultivated. Based on data from 26 crops, Parks computed a productivity index for Mexico (Table 21). Most of the increase came in the late 1940's and the 1950's as a result of the previous and contemporary programs that expanded irrigation and provided increased supplies of other improved inputs such as seeds and fertilizers. Following the Cardenas period yields increased at an accelerated rate.

Further indications of the changes in "yields" of the area harvested are given in Table 22 in terms of the Agricultural Gross Domestic Product per hectare harvested. The highest rate of growth in the yields was in the 1953 to 1957 period in which they increased at an annual average rate of 4.7 percent. The lower rate in 1958 to 1962 was due mainly to the fall in the market for the main export crops of cotton and coffee. Approximately 60 percent of the growth

Table 21. Land Productivity Index (Yield), Mexico, Average of Five-year Intervals, 1925 to 1960

Period	Annual Average Index	Average Annual Change	
		Index Points	Percent
1925-29	100.0	-	-
1930-34	98.0	-0.4	-0.4
1935-39	111.0	2.6	2.7
1940-44	116.8	1.2	1.0
1945-49	134.9	3.6	3.1
1950-54	155.8	4.2	3.1
1955-59	187.6	6.4	4.1
1960	197.6	-	-

Source: Parks, Richard W., "The Role of Agriculture in the Mexican Economic Development," Interamerican Economic Affairs, Vol. 18, No. 1 (Summer, 1964).

Table 22. Agricultural Gross Domestic Product, Total and Per Harvested Hectare, Mexico, Annual Averages of Five-year Intervals, 1938 to 1962

Period	Agricultural Product		Area Harvested		Product per Hectare Harvested	
	Millions of Pesos at 1950 Prices	Annual Rate of Growth, %	Thousands of Hectares	Annual Rate of Growth, %	Pesos at 1950 Prices	Annual Rate of Growth, %
1938-42	2,937	0.0	8,240	0.0	355	0.0
1943-47	3,702	4.7	8,550	0.7	433	4.0
1948-52	5,412	7.9	10,639	4.4	509	3.3
1953-57	7,342	6.3	11,446	1.5	641	4.7
1958-62	8,832	3.9	12,618	2.0	704	1.9
-----percent-----						
1958-62/ 1938-42	302.4	5.7	153.1	2.1	198.3	3.5

Source: Direccion de Economia Agricola. Reproduced from Vargas Torres, E. "El Producto y La Productividad Agricola" Trimestre Economico, Vol. 21, No. 2 (April-June 1965), Table 2, p. 256.

in Gross Agricultural Product was accounted for by increasing yield and the remainder by expansion of area harvested.

Changes in physical yields are, of course, a result of changes in physical inputs. But from the data available, the exact and complete nature of these relationships cannot be determined. In Mexico, as elsewhere, the degree of complementarity is high among improved inputs, especially where irrigation and water management are concerned. In addition to the direct effect of water there are interactions with other improved inputs. These other improved inputs have been concentrated in the irrigated areas. The presidents in this period, with their emphasis on industrialization, import substitution and the development of self-sufficiency in agricultural products, accelerated government expenditures on irrigation. The following summary of public expenditures on irrigation were calculated from data given in Table 18:

<u>Period</u>	<u>Million Pesos</u>	
	<u>Total</u>	<u>Average per Year</u>
1935-40	159	26.5
1941-46	646	107.7
1947-52	2,283	380.5
1953-58	3,254	542.3
1959-63	4,515	903.0

The Avila Camacho (1940-46) administration extended irrigation at an average rate of 7,600 hectares per month; Aleman during 1946-52 increased this rate to 8,700 hectares per month, and Ruiz Cortines increased the rate further to 10,700 hectares per month (Table 23). From 1941 to 1955,

Table 23. Land Irrigation, by Presidential Terms, Mexico,
1928 to 1964

President	Date Term Ended	Months	Hectares Irrigated	Average per Month
-----1,000 hectares-----				
Calles	Nov. 30, 1928	36	2	0.1
Portes Gil	Feb. 4, 1930	12	6	0.5
Ortiz Rubio	Sept. 1, 1932	36	50	1.4
Rodriguez	Nov. 30, 1934	24	91	3.8
Cardenas	Nov. 30, 1940	72	118	1.6
Avila Camacho	Nov. 30, 1946	72	549	7.6
Aleman	Nov. 30, 1952	72	626	8.7
Ruiz Cortines	Nov. 30, 1958	72	770	10.7
Lopez Mateos	Nov. 30, 1964	72	365	5.1

Source: Wilkie, James W., The Mexican Revolution: Federal Expenditure and Social Change Since 1910 (Berkeley: University of California Press, 1967), p. 198.

1.6 million hectares were benefited by irrigation (Table 24).

In 1946, the National Commission on Irrigation, due to the importance that irrigation expenditures had, and were to have , was transformed into the Secretariat of Hydraulic Resources (SHR). The main duties of the Secretariat were to develop the large irrigation (irrigacion grande) projects that covered more than 5,000 hectares, the small irrigation (irrigacion pequena) projects that covered less than 5,000 hectares, and to rehabilitate areas affected by inadequate drainage which led to high salinity and deterioration of the water. The SHA, in addition to developing new irrigation projects, was given the responsibility of improving the existing irrigation facilities. By 1964, 1.6 million hectares were covered by new projects and 910 thousand hectares had benefited from improvements in existing irrigation works (Table 25).

In 1941 President Avila Camacho expressed:

The future of agricultural production lies in the fertile lands of the coasts. A 'March to the Sea' will relieve congestion in our Central Mesa... But this march requires as prerequisites, sanitary and health measure, the opening of communications, the reclamation and drainage of swamps, and, to make such works possible, the expenditure of vast sums. It will be necessary to organize a new kind of tropical agriculture, which, because of the very nature of its production, cannot be based on minifundia [Poleman, 1964, p. 28].

The idea of a "March to the Sea" began to be acted upon in 1946 when a law created the National Colonization

Table 24. Additional Area Benefited by Irrigation Works, Mexico, Five-Year Periods 1936 to 1965

Period	Area, 1,000 Hectares
1936-40	118.7
1941-45	357.2
1946-50	563.3
1951-55	707.6
1956-60	406.9
1961-65	<u>542.8</u>
Total	2,696.5

Source: Banco de Mexico, Situacion y Perspectivas del Regadio en Mexico, and Secretaria de Recursos Hidraulicos, Informes Estadisticos, (Mexico, D.F.: Several issues).

Table 25. New and Improved Areas Benefited with Government Large and Small Irrigation Works, Mexico, Cumulative from 1930 to 1964

Year	New ^a	Improved ^b	Total	Year	New ^a	Improved ^b	Total
-----1,000 hectares-----				-----1,000 hectares-----			
1930 ^c	3	17	20	1948	581	460	1,041
1931	18	19	37	1949	643	480	1,123
1932	33	25	58	1950	676	511	1,187
1933	68	63	131	1951	707	535	1,242
1934	84	65	149	1952	807	635	1,442
1935	89	71	160	1953	888	696	1,584
1936	97	83	180	1954	1,020	726	1,746
1937	105	84	189	1955	1,120	788	1,908
1938	109	92	201	1956	1,271	815	2,086
1939	122	100	222	1957	1,333	832	2,165
1940	147	120	267	1958	1,358	832	2,189
1941	175	131	306	1959	1,383	838	2,221
1942	226	220	446	1960	1,404	858	2,262
1943	282	246	528	1961	1,433	872	2,305
1944	338	259	597	1962	1,458	883	2,341
1945	360	264	624	1963	1,507	896	2,403
1946	420	396	806	1964	1,568	910	2,478
1947	514	423	937				

^aLand that did not have irrigation previously.

^bLand previously irrigated, where improvements contributed to an increase or improved regulation of water.

^cFigures for 1930 are cumulative since 1926.

Source: Nacional Financiera, S.A., La Economía Mexicana en Cifras, (Mexico, D.F.: Nacional Financiera, S.A., 1965).

Commission to promote, administer and supervise settlement, and under President Aleman the idea of comprehensive river basin programs was integrated into the colonization program.

The River Basin Commissions were created as semi-autonomous agencies under the supervision of SHR. A number of these Commissions had broad authority not only on matters of water resources management and irrigation, but also to promote industrialization, agriculture and colonization in general, including the construction of roads, schools, urban improvement and public health facilities. The level of activities of the Commissions have been associated with their budgets. Their budgets, in turn, were directly related to the prevailing relationship and degree of influence of the director of the Commission with the president of the Republic.

The first and most important of these projects was the Papaolapan River Commission which was established to promote the development of the Papaolapan river basin in southeastern Mexico, on the Gulf coast. This Commission was established by President Aleman, in 1947, after a flood inundated a half-million acres and a hundred persons died in 1944. The region had been characterized by periodic flooding, isolation, disease, unpleasant climatic environment, scatter settlement, and primitive "slash and burn" (roza y quema) agriculture. The project started on a flamboyant large-scale gesture-- Aleman was a native of the basin. The Commission headquarters

were to be established in a new town to be constructed and named Ciudad Aleman, and the first major work to be constructed was the Aleman Dam. On the surface, it was an example of "proyectismo" (excessive optimism initially, expensive errors, and eventual abandonment). But there have been some accomplishments: the area is no longer outside the main stream of national progress as a new system of roads was opened, the area is largely free of flooding, educational programs have been started, and malaria incidence has been reduced; but colonization projects failed due to the paternalistic approach and the absence of proper screening of colonists.⁹ At the end of 1958, Lopez Mateos, who did not have an interest in the project, significantly reduced this Commission's powers and budget (Table 26).

The Tepaltepec River Commission was also created in 1947. The purpose of this Commission was to develop the river basin of the same name in the hot dry area of the Pacific. Ex-president Lazaro Cardenas was named its director. In 1960 the Balsas River Basin Commission was created and absorbed the Tepaltepec Commission.

⁹With reference to colonization schemes in the Lerma Basin, in the Mesa Central, Dozier points out that "One of the most serious weakness in those land development projects has been inadequate social assistance." Ejidatarios showed lack of desire to improve themselves, and were mentally unprepared to accept changes calculated for their betterment. Many government officials, being of an unprogressive nature, saw this as an unchangeable fact of life. Effort is needed to reorient and persuade the ejidatarios [Dozier, 1969, pp. 187-196].

Table 26. Expenditures by the River Basin^a Commissions, Mexico,
1947-1964

Year	Papalcapan		Grijalva		Tepalcatepec ^b	
	Current	1960	Current	1960	Current	1960
	Prices	Prices	Prices	Prices	Prices	Prices
in million pesos						
1947	7.8	18.6	-	-	2.4	5.7
1948	16.0	35.6	-	-	11.5	25.8
1949	21.0	43.5	-	-	14.1	29.3
1950	37.5	70.9	-	-	16.8	31.8
1951	77.9	122.3	-	-	20.7	32.5
1952	111.6	167.4	-	-	27.3	40.9
1953	115.1	174.9	5.5	8.4	27.7	42.0
1954	99.7	137.6	9.9	13.7	25.7	35.5
1955	96.6	117.9	13.6	16.6	32.5	39.6
1956	88.9	103.1	26.3	30.5	30.6	35.5
1957	89.0	98.8	28.0	31.1	38.3	42.5
1958	102.8	110.0	34.8	37.2	33.2	35.5
1959	40.8	42.8	24.3	25.5	19.9	20.9
1960	24.3	24.3	57.9	57.9	26.6	26.6
1961	30.0	29.7	49.4	48.9	10.8	10.8
1962	21.1	20.5	246.9	239.5	22.3	21.6
1963	23.7	22.5	412.3	391.7	53.9	51.2
1964	20.0	19.8	135.0	129.6	54.4	52.2
Total	1,023.8	1,360.4	1,043.9	1,030.6	468.8	579.9

Table 26. Continued.

Year	Fuerte		Total	
	Current Prices	1960 Prices	Current Prices	1960 Prices
-----in million pesos -----				
1947	--	--	10.2	24.3
1948	--	--	27.5	61.4
1949	--	--	35.1	72.8
1950	--	--	54.3	102.7
1951	--	--	98.6	154.8
1952	2.9	3.8	141.8	212.1
1953	38.0	57.8	186.3	283.1
1954	111.6	154.0	246.9	340.8
1955	144.1	175.8	286.8	349.9
1956	121.9	141.4	267.7	310.5
1957	60.2	66.8	215.5	239.2
1958	35.7	38.2	206.5	220.9
1959	20.0	21.0	105.0	110.2
1960	32.9	32.9	141.7	141.7
1961	23.2	23.0	113.4	112.6
1962	25.3	24.5	315.6	306.1
1963	42.0	39.9	531.9	505.3
1964	62.2	59.7	271.6	261.3
Total	720.0	838.8	3,256.5	3,809.7

^aThese figures do not include all public expenditures inside each basin, only those channeled through the Commissions themselves.

^bIncludes expenditures for the whole Balsas Basin, in which Tepalcatepec Basin Project was included since 1962.

Sources: Barkin, David and Timothy King, Regional Economic Development (London: Cambridge University Press, 1970), p. 94.

Later, two other commissions, the Grijalva and the Fuerte Commissions, were created for similar purposes in other regions.

Most of the work of the SHR, aside from the Commissions already mentioned, was the supervision of the irrigation districts of the Republic. The zones of their work were divided by the SHR into irrigation districts, whose authorities had the responsibility of allocating the water to the different farms in consultation with officials of the Secretariat of Agriculture. These powers of the officials of the irrigation districts have been used on several occasions by the government to demand privileged treatment, for several years, for the producers of certain crops. The commercial agriculture of Mexico is concentrated in the irrigation districts since these areas have the capacity to employ the new improved inputs and production techniques.¹⁰ The presence of commercialized agriculture in the irrigation districts is indicated by the fact that since 1946 export crops have accounted for about 50 to 74 percent of the value of all irrigated crops (Table 27). However, the export crops accounted for a much smaller percentage of the total irrigated area. The irrigated area used to produce exports

¹⁰Even so, the full potential of irrigation is far from being realized. In 1960, only 16 percent of the area of irrigated corn was planted with improved seeds.

Table 27. Area and Value of Crops Irrigated, by Export and Domestic Sectors, Mexico
1946-47 to 1963-64

Item	1946-47		1954-55		1961-62	
	Area	Value	Area	Value	Area	Value
	1,000 ha.	mil. pesos	1,000 ha.	mil. pesos	1,000 ha.	mil. pesos
Total	661	593	1,486	3,651	1,906	5,992
Export	262	325	886	2,712	737	3,442
Cotton	239	271	815	2,463	615	2,786
Coffee	-	-	-	-	-	1
Sugarcane	5	8	37	91	79	343
Other	13	45	35	158	43	307
Domestic	399	273	599	940	1,169	2,551
Wheat	155	89	342	496	392	932
Corn	148	83	132	114	318	468
Other	96	101	125	329	453	1,151
-----Exports, Irrigated as Percent of National Total -----						
	40	54	60	74	39	57

Table 27. Continued.

Item	1962-63		1963-64	
	Area	Value	Area	Value
	1,000 ha.	mil. pesos	1,000 ha.	mil. pesos
Total	1,789	5,671	2,055	7,137
Export				
Cotton	595	2,885	611	3,505
Coffee	480	2,165	488	2,650
Sugarcane	1	3	1	3
Other	75	339	78	401
	38	378	44	452
Domestic				
Wheat	1,194	2,786	1,433	3,632
Corn	463	1,166	518	1,503
Other	307	500	476	936
	424	1,120	449	1,192
-----Exports, Irrigated as Percent of National Total -----				
	33	51	30	49

Source: Nacional Financiera, S.A., La Economía Mexicana en Cifras, (Mexico, D.F.: Nacional Financiera, S.A., 1965).

declined after a peak was reached in 1954-55, mainly as a result of the reduction in area of cotton.

With regard to agricultural credit in this period, the main efforts were directed to the diversion of funds from private banks into agriculture, without additional direct official interference in the credit market.

The Fondo de Garantia y Fomento para la Agricultura, Ganaderia, y Avicultura (Guarantee and Development Fund of Agriculture) is a fund held by the Central Bank of Mexico to finance private banks. It was established in 1954, and its objective was to promote the participation of the private credit institutions in the financing of agriculture. The Fund encouraged the providing of credit by private institutions to agriculture for purposes of increasing the fixed and semi-fixed capital on farms. By 1959, 12 percent of the agricultural credit loans were for these purposes.

In the Fund, part of the loans given by private banks for the above purposes could be refinanced. The resources at the disposition of the Fund were available under the condition that the private institutions increase their loans to agriculture above their normal operations in that activity.

Fertilizers were among the improved inputs for which credit could be used. In 1940, only 285,361 of 6,729,905 hectares harvested had been fertilized, that is, only 4.2 percent. In 1950, 504,317 hectares or 5.9 percent of the total area was fertilized. By 1960, however, 17.2 percent

of the area harvested was fertilized--1.8 million of 10.4 million hectares harvested (Table 28).

Nacional Financiera, S.A., in the 1940's helped in the establishment of Guanos y Fertilizantes, S.A., to produce fertilizers in Mexico; in 1952 the name was changed to Guanomex. The use of fertilizers, about 13,000 tons in 1945, increased to over 300,000 tons by the 1960's. The production of fertilizers was stimulated, in part, by the government's protection of the infant national industry by means of duties and import licensing.

The use of fertilizers was concentrated on a few crops--corn, cotton, wheat and sugarcane. These crops received 80.5 percent of the fertilizers used in 1950.

The Rockefeller Foundation in the last three decades, in cooperation with Mexican scientists, developed improved crop varieties adapted to the Mexican environment. This activity was motivated, among other things, by the low yields in Mexico compared with other countries. In 1940, corn yield in the U.S. was 100 bushels per acre; in Mexico, it was only 8 bushels per acre [Stakman et al., 1967, p. 56]. In this program, higher yielding varieties of wheat, cotton, corn, and beans have been developed.¹¹

Government regulations in the agricultural market of basic commodities continued in this period, but in 1954 it was changed in order to affect the market only in a marginal manner.

¹¹Bean hybrids yield up to 2,000 kgs./ha. ["Mexico Produce Nuevas Variedades de Frijoles," 1962, p. 36].

Table 28. Fertilizers Used, Mexico, 1940, 1950 and 1960

Year	Area Fertilized	Area Harvested	Percent Fertilized
	(1,000 ha.)	(1,000 ha.)	
1940	285	6,730	4.2
1950	504	8,573	5.9
1960	1,782	10,375	17.2

Source: Censo Agrícola, Ganadero y Ejidal. Several Years.

In 1950, Nacional Reguladora y Distribuidora was dissolved and the Compania Exportadora Importadora, S.A. (CEIMSA--Export-Import Co.) was established and placed in charge of export and import activities related to food and cloth--the basic necessities of the population. Its initial activity was concentrated, as much as possible, in the commerce of the basic agricultural products. This approach of CEIMSA was initiated to improve the welfare of the urban population of Mexico. The urban prices of basic agricultural products had been increasing as part of the inflationary process. Guaranteed minimum prices were administered by CEIMSA in their operations with the farmers. By selling products at a lower price in the market, the urban sector was subsidized. This policy was applied to corn and beans.

In 1954, President Ruiz Cortines ordered that CEIMSA would only act marginally in the market and would not try to displace the private middlemen, and that the guaranteed prices of the agricultural products would be supported at levels consistent with the prices of industrial products.

In summary, as a consequence of the government programs implemented during this period, especially the expansion in irrigation and related inputs such as fertilization and improved seeds, there was an acceleration in the growth rate in the production of each of the major crops (Table 29). Although there were increases both in acreage and in yields, with the exceptions of coffee yields, both of these factors

Table 29. Area Harvested, Yield and Production, Principal Crops, Mexico, 1941-1958

Year	Corn	Peas	Wheat	Cotton	Cane	Coffee	Total
-----Area, 1,000 hectares-----							
Mean 1935-40	4,772	756	520	287	87	118	6,490
1941	5,343	892	583	316	116	126	7,376
1942	5,785	997	600	362	127	130	8,001
1943	4,758	927	510	406	139	134	6,874
1944	5,206	974	527	390	140	135	7,372
1945	5,369	964	468	366	141	135	7,443
1946	5,178	971	415	327	148	135	7,174
1947	5,506	981	498	333	157	135	7,610
1948	5,853	1,042	577	405	173	136	8,186
1949	5,982	1,424	535	549	201	145	8,836
1950	6,514	1,210	494	761	183	165	9,327
1951	6,384	1,150	644	884	196	166	9,424
1952	5,874	1,101	673	784	210	175	8,817
1953	6,505	1,075	593	753	222	205	9,353
1954	6,813	1,177	657	922	247	199	10,015
1955	6,762	1,191	765	1,059	258	221	10,258
1956	6,686	1,342	800	873	199	215	10,115
1957	6,440	1,153	937	916	258	272	9,976
1958	7,441	1,348	840	1,028	262	284	11,203
Mean	6,022	1,106	618	635	188	173	8,742
-----Yield, Kilogram per hectare ^a -----							
Mean 1935-40	552	195	772	250	48	482	
1941	608	238	745	257	49	411	
1942	628	244	815	284	54	401	
1943	587	225	715	283	49	391	
1944	690	249	710	272	49	446	
1945	634	222	740	267	48	405	
1946	719	189	819	278	49	420	
1947	717	268	846	288	53	409	
1948	761	266	827	296	55	392	
1949	757	261	941	378	52	408	
1950	721	258	911	345	51	397	
1951	773	248	877	326	50	410	
1952	756	253	863	337	51	405	
1953	766	305	1,020	363	53	428	
1954	854	361	1,098	424	53	426	
1955	836	377	1,063	480	54	421	
1956	803	322	1,326	487	54	410	
1957	835	356	1,437	522	57	358	
1958	828	378	1,592	512	58	429	
Mean	737	279	964	356	52	409	

Table 29. Continued.

Year	Corn	Beans	Wheat	Cotton	Cane	Coffee
-----Production, 1,000 metric tons-----						
Mean 1935-40	2,604	147	401	71	4,272	57
1941	3,249	212	434	61	5,677	52
1942	3,633	143	489	103	6,800	52
1943	2,793	109	364	116	6,858	52
1944	3,592	143	374	106	6,754	60
1945	3,404	214	347	98	6,742	55
1946	3,723	183	340	91	7,197	57
1947	3,928	263	422	96	8,412	55
1948	4,454	277	477	120	9,559	53
1949	4,529	372	503	208	10,432	60
1950	4,696	312	587	260	9,419	66
1951	4,935	285	590	288	9,830	68
1952	4,440	278	512	265	10,730	71
1953	4,983	328	671	274	11,682	88
1954	5,818	425	839	391	13,013	85
1955	5,653	449	850	508	14,002	93
1956	5,369	432	1,243	426	10,679	83
1957	5,377	410	1,377	478	14,597	97
1958	6,161	510	1,337	526	16,252	122
Mean	4,487	297	653	245	9,924	71
-----percent-----						
Annual Growth Rate	4.0	7.7	7.9	13.4	5.7	4.7

^aSugarcane yield is in metric tons, not kilograms.

Sources: Secretaria de Agricultura y Ganaderia, Direccion General de Economia Agricola, published in Horcasitas, Victor M. Algunos Indicadores del Desarrollo Agricola Mexicano en los Ultimos 27 Anos y su Cuantificacion (Mexico, D.F.: Escuela Nacional de Agricultura, 1967).

were in part associated with the irrigation programs. However, the total additional acreage exceeded the additional irrigated area.

1958 to the Present

On December 1, 1958, Adolfo Lopez Mateos became president of Mexico. He changed the emphasis in policies with respect to the agricultural sector. He called his approach "Integral Agrarian Reform"--continuing the efforts in providing the needed complementary inputs to agriculture, but at the same time, emphasizing the social aspects of agrarian policies, with the resumption of the redistribution of land at an accelerated rate.

During Lopez Mateos' six years in power he redistributed (dotaciones) over 16 million hectares to the ejidos, more than all his three predecessors in the presidency together and second only in redistribution effort, until that time, to Lazaro Cardenas. In December, 1964, Gustavo Diaz Ordaz came into power, but he made no significant changes in agricultural policies. He continued the emphasis on redistribution of land to the ejidos, and even exceeded the paces set by Lopez Mateos and Cardenas. He redistributed more than 23 million hectares. Associated with this was his program to complete new irrigation and flood-control projects, programs to increase the use of fertilizers, improve feed supplies to the livestock sector, and a Bureau of Rural Industries was established to develop industries for

processing agricultural products in rural areas. The whole objective was directed toward the improvement of rural welfare.

Aggregate growth

The rates of growth in crop and livestock production fell below those reached in the 1941-58 period, but they were still relatively high (Table 30). Positive growth rates occurred despite the occurrence of unfavorable weather in 1960-1961 and extended drought and high temperatures in 1966 and 1969.

Development of irrigation

Results of the expansion of irrigation in the previous period continued to be a major factor in the observed growth. The main efforts of the government's new irrigation projects, as in the previous period, were concentrated in the North Pacific, North and Central Zones (Table 31).

The agricultural zones as delineated by the Agricultural Censuses are outlined in Figure 1. The North covers the northeast corner of Mexico from the western mountains to the Gulf. The main products of this region are corn, cotton, beans and wheat. The Gulf includes the Gulf coast and the Yucatan peninsula. The main products of this region are henequen, sugarcane and coffee. The North Pacific includes the states of Baja California del Norte, Nayarit, Sinaloa, Sonora and the federal territory of Baja California del Sur.

Table 30. Agricultural Production, Mexico, 1959 to 1970

Year	Source I				
	Livestock		Crops		
	GDP, mil. ^a Pesos	Index (1900=100) ^b	% Change from Preceding Year	Index (1900=100)	% Change from Preceding Year
Mean 1941-58	3,103	232.5	3.9	258.3	6.8
1959	4,233	317.1	3.8	401.0	-6.6
1960	4,450	333.3	5.1	429.5	7.1
1961	4,624	346.3	3.9	464.7	8.2
1962	4,779	358.0	3.4	490.9	5.6
1963	4,922	368.6	2.9	496.5	1.1
1964	5,094	381.5	3.5	548.9	10.5
1965	5,217	394.5	3.4	-	-
1966	5,478	410.0	3.9	-	-
1967	5,670	424.7	3.6	-	-
1968	-	-	-	-	-
1969	-	-	-	-	-
1970	-	-	-	-	-
Mean 1959-70	-	-	-	-	-

Table 30. Continued.

Year	Source II			
	Livestock		Crops	
	Index (1961-65=100)	% Change from Preceding Year	Index (1961-65=100)	% Change from Preceding Year
Mean 1941-58	-	-	-	-
1959	84.4	-2.1	79	-2.4
1960	86.4	2.4	84	6.3
1961	94.2	9.0	86	2.4
1962	98.5	4.5	91	5.8
1963	100.2	1.8	97	6.6
1964	101.3	1.1	109	12.2
1965	105.7	4.3	107	7.3
1966	108.6	2.7	118	0.8
1967	108.9	0.3	120	1.7
1968	114.2	4.9	123	2.5
1969	119.6	4.8	111	-9.8
1970	124.9	4.6	124	11.7
Mean 1959-70	103.9	3.2	105	3.9

^aIn constant 1950 pesos.^b1900=1,335.

Sources: I. For livestock figures, Banco de Mexico, S.A. Producto Nacional Bruto, 1967, (Mexico, D.F.: 1968); for crops figures, Nacional Financiera, S.A. La Economía Mexicana en Cifras (Mexico, D.F., 1965).

II. For livestock and crop figures, U.S. Dept. of Agriculture, Economic Research Service. Indexes of Agricultural Production for the Western Hemisphere, ERS Foreign 44 and 264 (Wash., D.C.: April 1971).

Table 31. Regional Location of the Government's New Irrigation Projects, Mexico

Region	Cumulative Total to 1960		Before 1946		1947-60	
	(1,000 ha.)	(%)	(1,000 ha.)	(%)	(1,000 ha.)	(%)
North Pacific	613.5	43.7	150.5	36.9	463.0	46.5
South Pacific	66.4	4.7	28.0	6.9	38.4	3.9
North	393.3	28.0	126.2	30.9	267.1	26.8
Gulf	32.3	2.3	4.9	1.2	27.4	2.7
Central	<u>298.6</u>	<u>21.3</u>	<u>98.3</u>	<u>24.1</u>	<u>200.3</u>	<u>20.1</u>
Total	1,404.1	100.0	407.9	100.0	996.2	100.0

Source: Secretaria de Recursos Hidraulicos, Informe de Labores, 1960-61 (Mexico, D.F.: 1962).

The main crops in this region are corn, cotton, wheat and beans. This region had been the leader in the country's expansion of agricultural production since the immediately preceding period. The irrigation systems and farm production are centered in Sinaloa and southern Sonora. The terrain lends itself to the use of river water for irrigation purposes. In 1968 there were nine dams and reservoirs in operation and 10 more were planned for the region; also extensive searches are underway for new underground sources of water for deep well irrigation.

In the Pacific South the main crops are corn, coffee, and beans. Finally, the Center, located around Mexico City, includes only 14 percent of the National territory but it has 50 percent of the population.

Eight of the states located in the North and North Pacific Zones produced 77.5 percent of the value of the crops irrigated, and contained 75 percent of the publicly irrigated land in 1960 (Table 32). Sonora produced 1,329.2 million pesos of irrigated crops, and contained 20.1 percent of the total publicly irrigated land. Eight Northern states, in 1960, produced 95.8 percent of the total value of the production of cotton, 68.1 percent of the value of the production of wheat, 49.0 percent of the production of rice, 18.5 percent of the production of sugarcane, and 13.2 percent of the production of corn (Table 33).

Table 32. Value^a of All Crops Produced on Publicly Irrigated Land, by States, Mexico, 1960-61

State	Value of Crops in Publicly Irrigated Land Area		Publicly Irrigated Land Area
	(mil. pesos)	(percent)	(percent)
Baja California (North and South)	975.3	16.9	14.1
Chihuahua	230.8	4.0	3.9
Coahuila, Durango, Nuevo Leon	628.3	10.9	13.7
Sinaloa	764.3	13.2	5.9
Sonora	1,329.2	23.0	20.1
Tamaulipas	546.3	9.5	17.3
All Other States	<u>1,299.0</u>	<u>22.5</u>	<u>25.0</u>
Total	5,773.2	100.0	100.0

^aAt market prices.

Source: Secretaria de Recursos Hidraulicos, Estadistica Agricola, 1960-61, (Mexico, D.F.: Talleres Graficos de la Nacion, 1961), p. 247, reproduced by Freithaler, William O. Mexico's Foreign Trade and Economic Development, (New York: Praeger, 1968), p. 151.

Table 33. Value of Selected Crops Produced, by States, Mexico, 1960-61

State	Cotton	Wheat	Rice	Corn	Sugarcane
-----million pesos-----					
Baja California (North and South) ^a	529	106	-	5	0.9
Coahuila	296	66	-	15	-
Chihuahua	313	51	-	154	0.4
Durango	161	24	-	3	0.8
Nuevo Leon	33	17	-	65	0.4
Sinaloa	222	5	122	102	91.3
Sonora	719	432	22	555	-
Tamaulipas	455	2	-	119	83.9
All Other States	<u>120</u>	<u>330</u>	<u>149</u>	<u>3,408</u>	<u>785.1</u>
Total	2,848	1,033	292	3,926	962.1
-----percent-----					
Percentage of National Total in Eight Northern States	95.8	68.1	49.0	13.2	18.5

^aBaja California South is a Federal Territory and is included here with Baja California North, a State.

Source: Direccion General de Estadistica, Anuario Estadistico, 1960-61 (Mexico, D.F.: Secretaria de Industria y Comercio, 1963) pp. 352-364.

In the irrigation districts, yields as well as the crop area were increased. In the irrigation districts in 1960 the value of crop yield was 216 pesos per hectare, while outside the irrigation districts it was only 92 pesos per hectare. The irrigation districts contained only 15 percent of the area cultivated, but in 1960 these districts produced 40 percent of the gross value of the crops [Hertford, 1970, p. 91].

The irrigation districts in 1960 produced 84.7 percent of the cotton, 86.5 percent of the wheat, and significant shares of the other crops--sugarcane 33.0 percent, beans 20.8 percent, and corn 13.0 percent (Table 34). In 1960, 80.3 percent of the cotton and 68.3 percent of the wheat were irrigated (Table 35). With the expansion of irrigation and the development of new varieties, Mexico became self-sufficient in wheat production. During the late 1940's and earlier 1950's Mexico imported wheat. By the late 1950's Mexico was self-sufficient and wheat was exported in the 1960's. The production of wheat increased in the irrigation districts from 200 to 400 thousand tons in the late 1940's to 700 to 800 thousand tons in the earlier 1950's [Oribe Alba, 1960, p. 376]. The large difference in yields of cotton on irrigated compared with non-irrigated lands is indicated by data in Table 36. These data reflect the dual character of the Mexican agriculture as a division between irrigation and no irrigation rather than between ejidos and private property.

Table 34. Share of Major Crops Grown on Publicly Irrigated Land, 1960-1961

Crop	Total Value	Grown in Irrigation Districts	
		Value	Share of Total
	(mil. pesos)	(mil. pesos)	(percent)
Corn	3,925.8	511.1	13.0
Cotton	2,848.3	2,413.4	84.7
Wheat	1,033.2	893.5	86.5
Sugarcane	962.8	317.9	33.0
Coffee	945.9	.7	-
Beans	709.0	147.3	20.8
All Other Crops	<u>5,973.6</u>	<u>1,489.3</u>	<u>24.9</u>
Total	16,399.0	5,773.2	35.2

Sources: Direccion General Estadistica, Anuario Estadistico 1960-61, (Mexico, D.F.: Secretaria de Industria y Comercio, 1963), pp. 349-350, and Secretaria de Recursos Hidraulicos, Estadistica Agricola 1960-61, (Mexico, D.F.: Talleres Graficos de la Nacion, 1961), p. 247.

Table 35. Area of Crops Irrigated, 1960^a

Crop	Crop Area Harvested	Irrigated Area ^b	Crop Area Harvested that was Irrigated	Percent of Total Irrigated Area of Harvested Crops
	-----1,000 has.-----		-----percent-----	
Alfalfa	82.0	57.6	70.2	2.5
Beans ^d	741.3	76.0	10.3	3.2
Corn ^c	6,841.4	629.4	9.2	26.9
Cotton	752.2	603.7	80.3	25.8
Rice	96.3	53.6	55.7	2.3
Sugarcane	301.5	106.1	35.2	4.5
Wheat	846.1	578.1	68.3	24.7
Other	-	236.1	-	10.1
Total	-	2,350.6	-	100.0

^aSimilar data lacking for the previous censuses.

^bArea with existing facilities for irrigation.

^cIncludes alcacer corn (for feeding cattle), common corn intercalado (grown intermixed generally, with beans and/or haba), common corn alone and hybrid or improved corn.

^dExcludes beans planted together with corn.

Source: IV Censos Agrícola-Ganadero y Ejidal, 1960, General.

Table 36. Cotton: Yield in Selected Irrigation Districts, and Country Average, Mexico, 1960

Districts	Yield
	kg./ha.
Sto. Domingo	1,750
Rio Colorado	2,075
Region Laguera	1,664
Don Martin	1,093
Delicias	1,800
Ciudad Juarez	1,567
Culiacan y Guanase	1,094
Costa de Hermosillo	2,188
Rio Mayo	1,904
Rio Yagui	1,449
Matamoros	840
All Mexico	523

Source: De la Pena, Moises T. El Pueblo y su Tierra (Mexico, D.F.: Cuadernos Americanos, 1964), p. 576.

Irrigation projects were developed both from surface waters and from underground waters. In 1960, of 3.5 million hectares of irrigated land, 0.6 million hectares were supplied by underground water. Banco de Mexico reported in 1960 that an additional 7.7 million hectares were suitable for irrigation works--5.3 million by surface water and 2.4 million by underground water. It was estimated that by 1970, an additional 769,000 hectares would receive improvement by surface water through the Secretariat of Hydraulic Resources programs [Secretaria de Agricultura y Ganaderia et al., 1965, pp. 106-107].

The increases in production in the irrigation districts provides a good example of how Mexican institutions have worked in the field, despite the legal and administrative confusions often associated with them. When the National Commission of Irrigation was established in 1926, it was placed in charge of the operations and supervision of the irrigation districts which were being established. In 1935, by presidential decree, Cardenas ordered that the conservation, operation and colonization of the irrigation districts were to be the responsibility of the Banco Nacional de Credito Agrícola (National Bank of Agricultural Credit). In practice, this decree was not functional, as the majority of the districts created in those years were ejidos and the operation of ejidos areas was the responsibility of the Irrigation

Commission.¹¹ In 1944 a new presidential decree transferred the few districts administered by the Banco Nacional de Credito Agricola to the Commission.

When the Secretariat of Hydraulic Resources was established in 1947, and placed in charge of the planning and construction of new irrigation works, the Secretariat of Agriculture was given the responsibility of supervising the operations and colonization of the districts. In 1951, by presidential decree, the Secretariat of Hydraulic Resources was again placed in charge of the operations and conservation of the districts while colonization remained in the jurisdiction of the Secretariat of Agriculture [Oribe Alba, 1960, p. 363].

By 1964 the current projects of the SHR were the rehabilitation of 22 large irrigation districts where inadequate drainage systems had led to rising water tables and consequently to deterioration of the soils. Other projects included the digging of new drains and renovation of existing areas, lining of canals, and improvement of control structures.

¹¹President Cardenas in several decrees of 1938 and 1939, established the priorities for water distribution: first for domestic areas and public services, second for ejidos and private properties of less than 20 hectares, third for private farms between 20 and 150 hectares, and finally to the other farms. In practice, the disposition of the water was mainly affected by the prevailing type of farms in the irrigation area. Nevertheless, in 1950 the Supreme Court ruled the preference to the ejidos in water as unconstitutional [Fernandez y Fernandez, 1953, p. 94].

Tangible capital

Tangible capital in agriculture increased by a multiple of almost three between 1940 and 1960; between 1950 and 1960 the rate of increase was 4.1 percent per annum. The labor force increased also but at a slower rate than capital. Thus, capital per worker increased (Table 37). The largest increases were in cattle and public investments. Although cattle accounted for about 56 percent of the total capital in 1960, machinery and equipment showed the highest rate of growth—an annual average rate of 5.4 percent between 1950 and 1960 (Table 38). Machinery and equipment includes tractors, the number of which increased by a multiple of 12 in the 1940 to 1960 period. But in 1960 the main source of energy in the Mexican fields was still provided by work animals. The average amount of capital does not represent the model situation as capital is not evenly distributed throughout the farm economy. Capital is concentrated in the irrigation districts, and on the large private properties, rather than on the ejidos.

Credit

Credit has been used by the Mexican governments not only as a means to obtain needed inputs, but also, and especially in the case of the Banco Nacional de Credito Ejidal (BNCE - National Bank of Ejidal Credit), as a social institution providing needed funds, without hope of recovering them, to

Table 37. Capital in Agriculture, Mexico, 1940, 1950 and 1960

Item	1940	1950	1960
	---million pesos, at 1960 prices---		
Tangible Capital	13,874	24,997	37,323
Fixed	2,469	2,659	4,604
Machinery and Equipment	1,086	3,090	3,684
Cattle	8,705	14,911	21,054
Public Investments (accumulated)	1,614	4,397	7,981
Capital per Worker	3,600	5,200	6,100
	----Thous. workers-----		
Labor Force	3,840	4,820	6,080

Source: Censo Agrícola, Ganadero y Ejidal, several years.

Table 38. Composition of Capital in the Agricultural Sector, Mexico, 1950 and 1960^a

Item	1950	1960	Annual Rate of Change
	--million pesos--		(percent)
Fixed Capital			
Construction	1,347	1,691	2.3
Road and Railtracks	57	71	2.2
Hydraulic Works	1,255	1,922	4.4
Semifixed			
Machinery, Equipment and Vehicles	2,564	4,317	5.4
Tools and Appliances	<u>426</u>	<u>287</u>	<u>-3.9</u>
Total	5,649	8,288	3.9

^aExcludes livestock.

Source: Secretaria de Agricultura y Ganaderia et al., Proyecciones de la Oferta y la Demanda de Productos Agropecuarios en Mexico 1965, 1970 y 1975 (Mexico, D.F.: Banco de Mexico, 1965).

the ejidatarios. This social function of the BNCE - in addition to its economic function - has been a feature of this agency from its beginning to the present time. It was estimated that 35 percent of the BNCE clients had no present or future means for payments. Consequently, there was a high percentage of loans which were not repaid between 1936, when the bank was founded, and 1961. Selected years indicate that the non-repayment rate was 15 percent to as high as 47 percent (Table 39). From 1936 to 1960 the BNCE extended 8,539 million pesos in loans and over 25 percent (2,064 million pesos) of it was not repaid [Albornoz de la Escosura, 1966, pp. 287-305].

Several factors other than the lack of capacity to repay by the farmers were the cause of the high non-repayment rate in the BNCE. The local credit societies, which functioned as credit cooperatives and later were expected to expand the cooperative features to other aspects of the agricultural activities, never did function as such. The local societies were only nominal in existence since a centralized and bureaucratic structure administered everything. These societies were imposed on the ejidatarios by the government as a condition for receiving credit. This type of organization was justified by the Mexican officials due to the lack of education and even literacy on the part of the peasants. Thus, the government demanded a complete tutelage. But as time passed the farmers were never freed from this tutelage.

Table 39. Loans Made and Not Repaid by the Banco Nacional de Credito Ejidal, 1936 to 1961, Selected Years

Year	Value of Loans (mil. pesos)	Not Repaid	
		Value (mil. pesos)	Percent
1936	70	14	20
1941	167	47	28
1946	171	82	47
1951	240	37	15
1956	497	110	22
1961	476	150	31

Source: Albornoz de la Escosura, Alvaro, Trayectoria y Ritmo del Credito Agricola en Mexico (Mexico, D.F.: Instituto Mexicano de Investigaciones Economicas, 1966).

Undoubtedly, the backwardness of the peasants was one condition that hindered the development of credit societies into full cooperative status, but lack of government support after the Cardenas period was another factor. In 1938 he gave the cooperatives tax exemption privileges which were abolished by the new administration of Avila Camacho in 1941 [De la Pena, 1964, p. 864].

Another factor that accounted for the low recovery of loans by the BNCE was the variations in the ejidos' crop yields, which was caused by the variations in weather conditions. The requirement that official agricultural insurance be taken from the Federacion de Mutualidades del Seguro Agricola (Agricultural Insurance Federation), as a requisite for obtaining agricultural credit, permitted the BNCE to recover more of the loans than would have been expected otherwise. Another requisite of the BNCE was that credit be extended as work progressed. The Banco Nacional de Credito Agricola, in addition to the two requisites of the BNCE, required that the clients use official improved seeds, as well as fertilizers, and that they follow the recommendations of the officials of the Secretariat of Agriculture.

Due to the necessity of credit, it was used as a policy tool to stimulate production of selected crops. Article 58 of the Law of Agricultural Credit specified that the National Banks (BNCA and BNCE) could intervene at any time

in the productive activities of the borrower, if there were dangers of losing harvests. In 1953 President Ruiz Cortines used this part of the Law to place the government in absolute authority over the production of basic foods (corn, wheat, meat, milk, and beans). The National Banks supported the production of these crops through differences in the interest rates charged, and by providing credit on a longer term basis to obtain needed inputs to cultivate these specific crops. During the cotton crisis of 1959, the credit policies of the Banks were used to discourage its production.

The Banks not only extended credit, they also used credit arrangements to enforce the use of technical inputs and to provide technical advice. And in many instances the Banks were involved in marketing activities to protect their own interests, as the output was offered as collateral.

The BNCA, the bank serving the private farmers, had a higher rate of recovery of their loans than did the BNCE, the bank dealing with the ejidatarios. The BNCA recovered 87 percent of its loans in 1960. Associated with this is the fact that the local societies of credit had lost their importance in dealing with the BNCA--in 1960, 71 percent of the loans were given directly to individual farmers.

In 1960, credit in the amount of 2,867 million pesos was provided to the agricultural sector; only 18 percent of this amount was handled by private lenders and the remaining 82 percent was extended by the banking institutions--42 percent

by the private banks and 40 percent by the National Banks (Table 40).

Despite the importance of the National Banks in the agricultural sector, the credit extended to the non-agricultural sectors increased proportionally more than the credit to the agricultural sector. With 1942 used as the base of 100 for both agricultural and non-agricultural credit, the 1960 index of agricultural credit was 274, while the index of non-agricultural credit reached 835 [Albornoz de la Escosura, 1966].

Most of the credit in the agricultural sector was for the purpose of financing annual expenses (avio), while small percentages went to the other categories (refaccionario and inmobiliario) to finance fixed and semifixed capital.

Due to the lack of funds, the BNCE was estimated to be providing credit to only 13 percent of the ejidatarios [Romero Espinosa, 1963, p. 110]. One problem was that in order to obtain credit from a private bank, any ejidatario member of a society who had applied and had been refused credit by the BNCE, was required, according to Article 82 of the Agrarian Code, to obtain authorization from the BNCE in order to obtain credit from a private bank.

With respect to the National Banks, as a result of their dependence on the government and the lack of sufficient funds to satisfy the needs of the agricultural sector and the centralized and bureaucratic character of the administration of those banks, the activities of the banks were subject to

Table 40. Agricultural Loans, by Type of Lender, Mexico, 1940, 1950 and 1960

Type	1940	1950		1960	
		Value	Share	Value	Share
	(mil. pesos)	(mil. pesos)	(%)	(mil. pesos)	(%)
Banking					
Institutions	n.a.	449.0	64	2,215.2	82
Private	n.a.	n.a.	-	1,137.7	42
National	n.a.	n.a.	-	1,077.5	40
Private					
Lenders	n.a.	253.0	36	471.5	18
Total	35.8	702.0	100	2,686.7	100

n.a. Data not available.

Source: Censo Agrícola, Ganadero y Ejidal, Several years.

political and corrupt influences. A typical case in the early years of the National Banks was the case of the "agricultores nylon" ("nylon farmers") who obtained land and credit through political influence. This money was used to buy real estate in the cities and the National Banks never recovered their loans [Manzanilla Shaffer, 1964, p. 67].

Despite the creation of the BNCE, ejidatarios in certain zones were left out of its credit operations¹² and were forced to do without credit or to go to private lenders and pay their exorbitant rates. The branches of the BNCE did not reach all the regions; they were concentrated in the rapidly growing regions of the North and North Pacific, where the expected recovery rates were highest. President Diaz Ordaz followed Cardenas' example and in March 1965 founded another national bank, Banco Nacional Agropecuario (National Agriculture and Livestock Bank), which was given the responsibility for serving those regions where no regional bank had been established.

In another effort since 1959 to improve farm credit, in the form of medium and long term loans, two \$20 million AID loans were provided to Mexico, one in 1962 and the other in 1965, to be administered by the Guarantee and Development

¹²In 1945, 70 percent of the ejidatarios obtained credit from private sources [Whetten, 1948, p. 195].

Fund of Agriculture to give long term credit to small operators for permanent improvements at low interest rates. Also in 1965, a \$25 million agricultural loan was provided by the International Bank for Reconstruction and Development with the objective of providing credit to private farmers through private banks via a redistributing procedure to be administered by the Banco de Mexico.

Fertilizer

The use of fertilizers in Mexico has generally been concentrated on a few crops—such as cotton, sugarcane, corn, and wheat. In the cases of corn and wheat the increased use of fertilizers has been in conjunction with improved seeds. In 1962 the share of fertilizer use on cotton, wheat, corn and sugarcane was 88.9 percent of the total (Table 41). According to another source the use of fertilizers increased from 21.5 thousand tons in 1950 to 379.0 thousand tons in 1966 (Table 42). In 1962 around 14 percent of the area of harvested corn was fertilized; only in the cases of cotton and wheat were more than three-fourths of the area harvested fertilized.

While the use of fertilizers has continued to expand in Mexico, there are places where lands are cultivated as they were in the pre-Cortes epoch. This type of agriculture is found, for example, among the Indians of the mountains in the Huasteca region. Their primitive technique consists of

Table 41. Fertilizer Consumption, by Crops, Mexico, 1950 and 1962

Crop	1950		1962	
	Tons	Percent	Tons	Percent
Total	12,360	100.0	231,590	100.0
Sugarcane	6,922	56.0	14,359	6.2
Cotton	1,607	13.0	57,898	25.0
Corn	1,050	8.5	83,835	36.2
Wheat	371	3.0	49,792	21.5
Other crops	2,410	19.5	25,706	11.1

Source: Vargas Torres, E., "El Producto y la Productividad Agrícola," El Trimestre Económico, Vol. 21, No. 2 (April-June, 1965), p. 259.

Table 42. Consumption of Fertilizers, Mexico, 1950 to 1966 and Potential

Periods	Nitrogen (N)	Phosphates(P_2O_5)	Potash (K_2O)	Total
-----in 1,000 tons of plant nutrients-----				
1950	10.4	8.9	2.2	21.5
Ave. 1957-59	87.3	32.0	12.1	131.4
Ave. 1960-62	128.4	42.9	14.2	185.5
1963	190.4	61.5	11.3	263.2
1964	228.5	59.5	12.5	300.5
1966	261.1	103.7	14.2	379.0

Elements	Actual Consumption	Potential Consumption ^a	Actual as % of Potential Consumption
Nitrogen	229	630	36
Phosphates	60	360	16
Potash	13	180	7
Total (N,P,K)	301	1,170	26

^aPotential consumption was estimated on the basis of the area to which fertilizers could be applied at that time.

Sources: U.S. Dept. of Agriculture, Economic Research Service. Regional Integration of the Chemical Fertilizer Industry in Latin America. ERS - Foreign 232 (Wash., D.C.: June 1968) pp. 10, 12; for 1950 and 1966, Venezian, E.L. and W.V. Gamble. 200 The Agricultural Development of Mexico. (New York: Praeger, 1969) p. 103. 200

burning an area of land and sometimes planting the seeds by the use of a "coa" (a primitive instrument used by the Indians). The implement used most often when tilling the soil is the Egyptian plough pulled by mules or oxen.

High fertilizer prices are a serious deterrent to the greater use of fertilizers. In Mexico, in 1965, the prices paid by farmers per ton were \$63 for ammonium sulphate, \$40 for superphosphate, and \$72 for potassium chloride [U.S. Department of Agriculture, 1968, p. 14]. In the United States these prices were \$53, \$40 and \$54, respectively [U.S. Department of Agriculture, 1966a, pp. 166-167].

Mexico has initiated a policy, not only to become self-sufficient in fertilizers, but also to export them to other Latin American countries.

Guanomex, S.A., which has the monopoly for producing fertilizers in Mexico, receives its raw materials mainly from PEMEX (State Petroleum Development Corporation) for nitrogen and from private companies associated with PEMEX for phosphatic components. Mexican plants' capacity for producing fertilizers is 1.6 million tons (478,000 tons of nutrients) per year. Further expansion of capacity is underway and surplus production in nitrogenous and phosphatic fertilizers is planned. Domestic production had been supplemented with imports of organic and chemical fertilizers, mainly from the U.S. (Table 43).

Table 43. Imports of Organic and Chemical Fertilizers,
Mexico, 1961-1964

Year	Organic	Chemical
	-----in tons-----	
1961	529	185,526
1962	798	153,036
1963	1,224	153,170
1964	2,425	228,634

Source: U.S. Dept. of Agriculture, Economic Research Service, Regional Integration of the Chemical Fertilizer Industry, in Latin America, ERS - Foreign 232 (Wash., D.C.: June 1968), p. 31.

Improved seeds

The cooperative research effort of the Rockefeller Foundation and the Government of Mexico, with emphasis on improved varieties and the training of Mexican scientists that was established in the preceding period, has been continued. The results have been excellent. Improved seed varieties have been developed for corn and wheat. Efforts have also been directed toward improving sorghum varieties, potatoes and development of hybrids such as "triticale," a cross of wheat and rye. Mexico, at present, has its own research organization, Instituto Nacional de Investigaciones Agrícolas (INIA - National Institute of Agricultural Research) in Chapingo, where the Center for the Improvement of Corn and Wheat is located. Efforts at present are concentrated in the Puebla project, a testing area for commercializing subsistence agriculture by using the package and demonstration approach.

A hybrid variety of corn, developed by the Rockefeller Foundation, produced in 1960 an average of 1,471 kgs. per hectare, while the common corn produced only 841 kgs. per hectare or 57 percent of the average yield of the hybrid variety. This improvement is an indication of Mexico's potential for increasing its corn production and for releasing land for other uses. In 1960, according to the Census of that year, 5,451,800 hectares were planted with common

corn alone, while only 308,700 hectares were planted with the improved variety (Table 44).

Data supplied by the Productora de Semillas (Seed Producer Company) are not directly comparable with those from the Census. This Company reported that the production of corn to be used for planting increased from 2,000 tons in 1948-49 to six times that amount, or 12,185 tons, in 1962-63; this permitted the area planted with improved seeds to increase from 111 thousand hectares in 1948-49 (1.8 percent of the area harvested) to 677 thousand hectares in 1961-62 (9.7 percent of the area harvested) (Table 45). The high cost of the improved seeds, initially, kept them out of reach of the subsistence farmer.

In the earlier 1960's enough improved cotton seeds were available to plant all the area of cotton harvested (Table 46).

In the case of wheat, in 1962-63, almost 44 percent of the area harvested was planted with improved seeds. The production of the hybrid seeds reached 34 thousand tons in 1962-63 (Table 47).

Productora Nacional de Semillas, S.A., has a monopoly in the production of seed corn. This may be one reason for the high cost of the improved corn for seed, but even if the cost was lower, an extensive demonstration service would be needed to overcome the tradition-bound subsistence corn producers.

Table 44. Corn Yield and Area Harvested, by Varieties^a, Mexico, 1960

Variety	Yield (kg./ha.)	Area Harvested		% of Irrigated Area (%)
		Total (1,000 ha.)	Irrigated (1,000 ha.)	
Hybrid or Improved Corn	1,471	308.7	98.3	15.8
Common Corn Alone	841	5,451.8	457.3	73.8
Common Corn Intercalado (mixed with beans and/or haba)	636	1,042.0	64.1	10.4
		6,802.5	619.7	100.0

^aExcludes alcacer corn (for feeding cattle).Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 45. Production of Improved Corn Seed and Area Harvested, Mexico, 1948-1963

Year	Production of Improved Seeds	Area Harvested		Percentage of Area Harvested Used Improved Seed
		Used Improved Seed	Total	
	(ton)	(1,000 ha.)	(1,000 ha.)	(percent)
1948-49	2,000	111	6,129	1.8
1949-50	2,500	139	6,866	2.0
1950-51	2,700	150	6,874	2.2
1951-52	3,000	167	6,440	2.6
1952-53	2,400	133	6,099	2.2
1953-54	3,800	211	6,425	3.3
1954-55	5,382	299	6,391	4.7
1955-56	4,816	268	6,319	4.2
1956-57	2,008	112	6,067	1.8
1957-58	3,968	220	6,973	3.2
1958-59	8,754	486	6,712	7.2
1959-60	4,914	273	5,582	4.9
1960-61	8,286	460	6,884	6.7
1961-62	12,185	677	6,965	9.7

Source: Vargas Torres, E. "El Producto y la Productividad Agrícola" El Trimestre Económico, Vol. 21, No. 2 (April-June, 1965), p. 260.

Table 46. Production of Certified Cotton Seed and Area Planted, Mexico, 1959-1963

Year	Production of Certified Seed	Area Harvested		Percentage of Area Harvested Which Could be Planted with Improved Seed
		Estimated that Could be Planted with Certified Seeds	Total	
	(tons)	(hectares)	(hectares)	(percent)
1959	27,267	717,553	751,159	95.5
1960	35,289	928,657	899,122	103.3
1961	28,893	760,342	793,964	95.8
1962	35,099	923,658	788,031	117.2
1963	26,550	698,684	760,924	91.8

Source: Vargas Torres, E. "El Producto y la Productividad Agricola" El Trimestre Economico, Vol. 21, No. 2 (April-June, 1965), p. 259.

Table 47. Production of Certified Wheat Seed and Area Planted, Mexico, 1960-63

Year	Production of Improved Seed	Estimated Area that Could be Planted with Improved Seeds	Total	Percentage of Area Harvested with Improved Seeds
	(tons)	(hectares)	(hectares)	(percent)
1960-61	25,544	283,822	815,620	34.8
1961-62	20,908	232,311	712,293	32.6
1962-63	34,013	377,922	865,039	43.7

Source: Vargas Torres, E., "El Producto y la Productividad Agrícola" El Trimestre Económico, Vol. 21, No. 2 (April-June 1965), p. 260.

Professional technicians

More technicians are needed in agriculture than were available in 1960. In that year, only 8,072 technicians were available---a number equal to only 1.3 percent of the active population in agricultural activities (Table 48).

Price and marketing programs

Government support of the agricultural markets, which was reduced by President Ruiz Cortines, was strengthened beginning with the presidency of Lopez Mateos.

CIEMSA's name was changed to Compania Nacional de Subsistencias Populares (CONASUPO) by President Lopez Mateos in 1961, since its operations were to cover more than export-import activities. CONASUPO's objectives were to provide, at prices they could afford, the products to fill basic needs of the working class, while stimulating production of the basic commodities of the agricultural sector through price policy and farm income subsidies.

CONASUPO established, for certain crops, a set of guaranteed prices based on its own estimates of the costs of production and a normal return to maintain a certain standard of living. In establishing the price, the level of the emergency stocks of those products and their levels of production were considered also. In order to influence production the guaranteed prices and the quality requirements¹³ were published prior to the planting times.

¹³For certain crops, a lower price was offered for lower quality.

Table 48. Professionals and Technicians in Agriculture in Relation to Agricultural Population, Mexico, 1950 and 1960

Item	1950	1960
Professionals and Technicians	1,197	8,072
Active Agricultural Population (1,000)	4,838	6,145
Population per Professional and Technician	4,842	761

Source: V Congreso Industrias, La Educacion en el Desarrollo Nacional (Mexico, D.F.: 1964); Venezian, E.L. and W.K. Gamble, The Agricultural Development of Mexico (New York: Praeger, 1969), p. 116.

CONASUPO established its own distribution system. It operated retail stores, over 400 stationary as well as 51 mobile units. Its policy was to buy significant quantities of certain commodities and to sell them at low prices, keeping marketing expenses at a minimum, in order to apply competitive pressures on the other retailers. In 1963, CONASUPO bought over 800,000 metric tons of corn¹⁴ (Table 49). Prices of wheat, beans and rice were supported also.¹⁵

In addition to the fact that it was not the objective of CONASUPO to buy the entire production of a given crop, there were other factors that limited its purchases. Prevailing market prices may be higher than those offered, previous commitments by producers to sell to credit suppliers, distance, perishability and lack of transportation, and sometimes products do not meet the minimum requirements.

In recent years, when there was excess production of some crops, particularly corn, the CONASUPO guaranteed price policies were not applied to all farmers, but were limited to the marginal ones, generally those in non-irrigated areas. Also, provision was made for critical situations such as droughts. CONASUPO, in addition to influencing production

¹⁴CEIMSA, precursor of CONASUPO, in 1953-58 bought 4,556 thousand tons of corn, 390 thousand tons of beans and 2,848 thousand tons of wheat ["La Nueva CEIMSA," 1959].

¹⁵In general, CONASUPO policies have covered around 33 percent of the total value of the corn production; beans, 77 percent; cotton, 8 percent; and rice, 1.5 percent.

Table 49. Annual Government Purchases of Corn at Support Prices, Mexico, 1959-63

Year	Tons
1959	174,622
1960	750,175
1961	595,210
1962	728,678
1963	872,171

Sources: CONASUPO, Memorias e Informes, 1964; Comercio Exterior (March, 1966), p. 178.

through its guaranteed price policies, coordinated its policies with the Secretariat of Agriculture and influenced the location of production through price programs and water allocation.

To better serve the farmers and the consumers, and to avoid the large loss in tonnage of crops every year, CONASUPO transferred all its storage facilities to a specialized corporation that now handles all storage for CONASUPO—Almacenes Nacionales de Depósito, S.A. (ANDSA, National Warehouses of Storage). Despite the presence of CONASUPO, the intermediaries in 1960 handled an average of 41 percent of the retail value of the agricultural products [Gonzalez Ramirez, 1966, p. 421]. Several factors accounted for this but mainly they are: the isolation and smallness of the farms, their desperate economic situation, insufficient number of storage facilities and transport difficulties.

In general, prices have increased rather continuously since the beginning of World War II. Prices of crop products have risen faster than the general retail price index and increases in prices of livestock products have exceeded those for crops (Tables 50 and 51). The implicit price index rose at a compound annual rate of 3.4 percent between 1960 and 1969 (Table 52).

This increase in prices is an indication that the domestic supply was not increasing as rapidly as the domestic demand. In addition, there was an increase in meat exports

Table 50. Retail Price Indexes, Mexico City, Selected Years, 1945 to 1960

<u>Retail Price Index</u>			
Year	General	Crops Products	Animal Products
-----1929=100-----			
1945	199.6	188.6	276.6
1950	297.8	320.9	330.6
1955	500.4	550.4	584.5
1960	633.0	668.0	758.0

Source: De la Pena, Moises. El Pueblo y su Tierra, (Mexico, D.F.: Cuadernos Americanos, 1964), p. 640.

Table 51. Wholesale Price Indexes: General and Animal Products, Mexico, Selected Years, 1940 to 1965

<u>Wholesale Price Index</u>		
Year	General	Products of Animal Origin
	-----1954=100-----	
1940	23.9	19.4
1945	46.3	60.0
1950	72.5	71.3
1955	113.6	123.9
1960	137.5	173.8
1965	150.9	188.6

Source: Horcasitas, Victor M., Algunos Indicadores del Desarrollo Agrícola Mexicano en los Últimos 27 Años y su Cuantificación (Mexico, D.F.: Escuela Nacional de Agricultura, 1967) p. 50.

Table 52. Implicit Price Indexes, Mexico, 1960 to 1969

Year	Index (1968=100)	% Change from Preceding Year
1960	76	-
1961	78	2.6
1962	82	5.1
1963	83	1.2
1964	86	3.6
1965	89	3.5
1966	93	4.5
1967	97	4.3
1968	100	3.1
1969	103	3.0
Mean	89	3.4

Source: Agency for International Development, U.S. Dept. of State, Gross National Product, Growth Rates and Trend Data by Region and Country (RC-W-138), Office of Statistics and Reports, Bureau for Program and Policy Coordination, April 30, 1970, p. 15.

from 39.0 million pounds of beef and veal in 1960 to 65.6 million pounds in 1968, while exports of cattle and calves to the U.S. rose from 391 thousand heads in 1960 to 702 thousand heads in 1968. These exports are a reflection of the increasing demand for beef and higher prices in the U.S. The concern of the government with the conditions of the livestock sector has been manifested in several actions. In 1962 the government reduced export taxes by 50 percent for steers on feed at least two months prior to shipment to the U.S. if they were located within 125 miles of the U.S. frontier. Since 1963 the government has also encouraged feed production for cattle and the Institute of Livestock Research was experimenting to improve rations. In the planning stage are plans for national breeding stations, livestock insurance, livestock vaccination and a sanitation campaign.

In 1966 a National Livestock Council was created to advise the government on improvements to expand production.

Agricultural insurance

In 1954, the initial studies for the development of the agricultural insurance were started. In that year the government established the Comision de Estudios y Planeacion del Seguro Agricola Integral (Commission for the Study and Planning of the Integral Agricultural Insurance). The only agricultural insurance that had been available covered losses

from fire and hail and was obtained from private companies.¹⁶

On December 30, 1961, the law creating the Integrated Agricultural Insurance was published. The insurance would cover not only losses from fire and hail, but also losses from frost, drought, hurricane, disease, floods and excess humidity. The insurance was limited to 70 percent of the value of crops, if planted on irrigated land and fertilizer was used. If fertilizer was not used, only 60 percent of the crop would be insured. The agricultural insurance acted mainly as an insurance on credit used in production. On the seasonal lands, insurance covered only 50 percent of the value of the crop.

Growth of individual crop and livestock enterprises

From 1951 to 1965 there were significant upward trends in per capita utilization of the basic food crops. For example, the per capita utilization of corn increased at an annual average of 4.9 kilograms during this period, from 132.5 kilograms in 1951-53 to 193.8 kilograms in 1963-65 [Gayoso and McPherson, 1971, p. 187]. A 1958-60 balance of supply and demand shows surpluses for corn, wheat, rice and beans, and deficits in fruits, vegetables and especially livestock products (Table 53). Subsequently, the growth rate in the output of the basic grains appears to have slackened

¹⁶The Agricultural Credit Laws of 1926 and 1931 assigned the functions of agricultural insurance to the reserve funds of the local credit societies, but the funds were never constituted.

Table 53. Demand and Supply Balance, Selected Agricultural Products, Mexico, 1958-60

Crop Products	Demand	Supply Balance	
		--million pesos, 1960 prices--	
Corn	7,050	+	283
Wheat	2,171	+	690
Rice	533	+	119
Sorghum	324	-	36
Barley	321	-	49
Beans	1,248	+	239
Garbanzos	254	-	92
Vegetables	1,048	-	215
Alfalfa	703	-	73
Fruits	3,843	-	990
Oleaginous Crops	2,449	-	477
Coffee	1,081	+	104
Cotton	3,442	+	4
Henequen	166	-	22
Sugarcane	2,938	-	108
Others	1,484	-	218
Total Crops	29,055	-	841
<u>Livestock Products</u>			
Meat	8,376	-	2,031
Eggs	3,348	-	-
Milk	7,066	-	619
Others	1,511	-	345
Total Livestock	20,301	-	2,995
Total Crops and Livestock	49,356	-	3,836

Source: Secretaria de Agricultura y Ganaderia et al. Proyecciones de la Oferta y la Demanda de Productos Agropecuarios en Mexico, 1965, 1970 y 1975. (Mexico, D.F.: Banco de Mexico, 1965), p. 16-25.

during the 1960's (Table 54, 55, and 56).

Despite the possibility of a negative income elasticity, corn is still the most important item in basic Mexican food. This high level use of corn is a result of its adaptability to a range of production conditions and thus its wide geographical distribution through all the Mexican states, although in some of them, the economic conditions of production are not as favorable as in others. Corn is cultivated in all altitudes in Mexico, both at sea level and at altitudes over 3,000 meters. Despite this wide range of adaptability, the national production of corn has varied widely from year-to-year as a result of variations in weather conditions.

The increase in corn production was due to the government policies of providing complementary inputs--mainly irrigation, fertilizers and improved seeds--and a guaranteed price policy. Corn exports rose sharply, from 300 thousand tons in 1964 to 1,930 thousand tons in 1965 [Secretaria de Agricultura y Ganaderia, et al., 1966]. The guaranteed prices transformed the production of corn for the market, in the areas where the most improved techniques were employed, into a profitable operation in relation to the other crops.¹⁷ The value of corn exported in 1965 was U.S.\$77 million, which when added to the value of the exported wheat constituted 22 percent of

¹⁷Gross income per hectare harvested increased more for corn than for cotton, sugarcane, alfalfa, or tomatoes in the 1950's [Secretaria de Agricultura y Ganaderia, et al., 1966, p. 124].

Table 54. Production of Main Crops, Mexico, 1959 to 1970

Year	Beans, Dry	Sugarcane	Coffee	Corn	Cotton	Henequen	Oranges
					1,000 metric tons		
1959	520	17,765	123	5,563	368	129	674
1960	600	19,541	126	5,386	457	149	766
1961	617	19,732	141	5,561	434	156	687
1962	633	19,830	132	5,450	528	156	795
1963	700	17,822	171	6,690	459	136	800
1964	892	19,799	159	7,500	521	149	860
1965	858	22,431	180	8,000	572	147	865
1966	1,000	23,132	159	8,200	490	142	880
1967	1,008	25,556	174	8,500	435	140	882
1968	1,056	24,383	171	8,600	537	120	892
1969	833	27,047	183	6,500	381	115	937
1970 ^a	1,100	26,814	192	8,200	341	110	1,020
Mean	818	21,992	152	7,012	460	137	838
Growth Rate	6.6	4.0	3.9	4.2	-0.6	-2.2	3.2

Table 54. Continued.

Year	Potatoes	Sorghum	Tomatoes	Straw- berries	Tobacco	Watermelon	Wheat
	--1,000 metric tons--						
1959	250	179	372	-	28	127	1,266
1960	294	209	389	-	43	134	1,190
1961	303	225	453	24	52	136	1,402
1962	355	236	433	27	48	204	1,502
1963	375	402	464	28	34	213	1,703
1964	421	525	445	35	42	340	1,900
1965	436	663	524	42	43	363	2,088
1966	457	1,340	497	146	42	385	1,609
1967	378	1,242	617	126	47	390	2,057
1968	400	1,200	666	98	46	420	1,793
1969 ^a	576	1,400	756	101	62	460	2,000
1970 ^a	600	1,700	940	118	63	424	2,100
Mean	404	777	546	74	46	300	1,718
Growth Rate ^b	6.8	25.9	7.6	23.6	4.2	13.9	4.8
percent--							

^aPreliminary.^bGrowth Rate computed from data in Appendix Table 174.

Source: U.S. Dept. of Agriculture, Economic Research Service, Indexes of Agricultural Production for the Western Hemisphere, ERS--Foreign 264 and 44, (Washington, D.C.: April 1971; Jan. 1966), p. 24.

Table 55. Area Harvested of Selected Agricultural Products,
Mexico, 1965 to 1970

Crop	1965	1966	1967	1968	1969	1970
-----1,000 hectares-----						
Corn	7,000	7,500	7,584	7,600	7,250	7,500
Wheat	847	683	762	717	715	715
Beans, dry	2,100	2,200	2,241	2,250	1,712	2,000
Rice, rough	153	165	167	167	175	200
Cotton	793	701	689	722	541	435
Potato	53	53	38	40	48	50
Tobacco	24	25	23	23	35	37
Sorghum	-	542	556	1,000	1,000	1,000

Source: U.S. Dept. of Agriculture, Economic Research Service,
The Agricultural Situation in the Western Hemisphere,
Foreign Agricultural Economic Report Numbers 222, 261,
312 (Washington, D.C., 1968, 1969, 1970).

Table 56. Area Harvested, Yield and Production, Principal Crops, Mexico, 1959 to 1965

Year	Corn	Beans	Wheat	Cotton	Sugar- cane	Coffee	Total
Mean 1941-58	6,022	1,106	618	635	188	173	8,742
1959	7,223	1,411	937	751	315	285	10,922
1960	6,103	1,327	840	899	346	304	9,819
1961	6,196	1,380	837	794	348	307	9,862
1962	6,548	1,672	747	787	362	314	10,430
1963	6,961	1,710	810	847	378	323	11,029
1964	7,760	2,092	835	809	382	315	12,195
1965	7,800	2,100	847	840	370	-	-
Mean 1959-65	6,942	1,670	836	818	357	308	10,710
-----Yield, Kilograms per hectare ^a -----							
Mean 1941-58	737	279	964	356	52	409	
1959	800	412	1,351	506	56	342	
1960	995	398	1,417	523	56	408	
1961	993	447	1,676	566	55	412	
1962	995	392	1,946	622	56	445	
1963	987	396	2,077	632	59	425	
1964	1,089	426	2,555	700	60	470	
1965	1,090	430	2,466	695	60	-	
Mean 1959-65	1,001	414	1,933	606	58	417	
-----Production, 1,000 metric tons-----							
Mean 1941-58	4,487	297	653	245	9,924	71	
1959	6,356	581	1,226	380	17,765	98	
1960	6,073	528	1,190	470	19,542	124	
1961	6,152	617	1,402	450	19,167	127	
1962	6,516	656	1,455	486	21,116	140	
1963	6,870	677	1,703	535	22,327	137	
1964	8,454	892	2,134	566	22,878	148	
1965	8,502	903	2,088	584	22,200	-	
Mean 1959-65	6,989	693	1,599	496	20,713	129	
-----percent-----							
Growth Rate ^b	5.4	8.8	11.7	7.3	5.2	7.3	

^aSugarcane yield is in metric tons, not kilograms.^bGrowth rate computed from data in Appendix Table 173.

Sources: Secretaria de Agricultura y Ganaderia, Direccion General de Economia Agricola, published in Horcasitas, Victor M., Algunos Indicadores del Desarrollo Agricola Mexicano en los Ultimos 27 Anos y su Cuantificacion, (Mexico, D.F.: Escuela Nacional de Agricultura, 1967).

the total value of agricultural exports for that year. These exports were considered "emergency" ones, since they were made through a government subsidy; but nevertheless they helped to give the picture that Mexico was producing more corn than was needed for domestic consumption. Production reached a maximum of 8.6 million metric tons in 1968, and since then, the government has been trying to reduce the surplus production of corn as CONASUPO takes a loss when selling on the world market, in addition to costs of storage and transportation. .

The next most important product of the Mexican diet is beans. In many areas, corn and beans are planted "intercalados" (intermixed) in the same field. The purpose of this system of subsistence agriculture was to grow enough for family consumption. If they produced more than the family needed, the excess was sold; if less was produced consumption was restricted as the peasant rarely bought any. In certain areas where communications were better and where diseases were not a problem, beans were grown for commercial purposes. Production of beans has increased in each period, but apparently has been stabilized after 1966--though conclusions drawn from short periods should be viewed with caution. As is the case of corn, actions have been taken to cut back the surplus of beans that was built up over the last few years--over 300,000 metric tons for which there was no profitable market outside Mexico. Since 1968, the Secretariat

of Agriculture, official agricultural banks, and SHR established a program to cut bean output and to shift production to varieties acceptable to foreign markets.

In the preceding periods the acreage of wheat increased but the yield per hectare showed no trend up to 1950. But the yield also has increased significantly since 1950. During the 1950's yield increased at an average rate of 5.0 percent per annum, and in 1965 the average yield of wheat was 2,466 kgs./ha., almost four times the yield of 1925. As a result of increases in area harvested and in yield, the production of wheat in 1965 was 2,088 thousand metric tons, or seven times the production of wheat in 1925. But there has been no significant increase in total production since 1965.

Wheat production is one of the crops which is heavily dependent on the soil moisture. In 1960, 68.3 percent of the total area of wheat harvested was irrigated.

Undoubtedly the significant increase in the yields of wheat have been due to the irrigation program accompanied by the new varieties and fertilizer. Indirectly, the growth of wheat production was also influenced by the growth on the demand side which increased prices and provided the incentive for the application of additional inputs. As the income per capita increased in Mexico the demand for wheat, a relatively superior good, increased in part as a result of the decrease in demand for corn, an inferior good.

Wheat especially has benefited from research done by the Rockefeller Foundation and the Secretariat of Agriculture. Prior to the development of rust resistant varieties, farmers fought this problem with low seeding rates--18 lbs. per acre--and little fertilizer use, so stands would be thin. Presently, yields are 60 bushels per acre using 80 lbs. of seed and 100 lbs. of nitrogen per acre where the yields previously were 15 bushels per acre.

The increase in wheat production between 1940 and 1965 was sufficient to change Mexico's international balance from the import of 200,000 tons in the first half of the 1940's to an export of 600,000 tons in 1964, as well as in 1965--a value of U.S.\$42 million in exports in 1965.¹⁸ Price support levels have been reduced in the irrigated areas of the northwest which normally supplied two-thirds of the wheat crop.

The other three of the six principal crops of Mexico--cotton, sugarcane and coffee--are cash crops, i.e., nearly all production is sold from the farm and a significant part of it is exported. The increase in production of these crops was one of the indications of the increasing degree of commercialization of Mexican agriculture.¹⁹

¹⁸These exports were considered emergency exports, and made possible through government subsidies. Later, the Government took steps to discourage them.

¹⁹According to the agricultural census of 1940, only 50 percent of the crop production was sold, the rest was consumed on the farms; in 1950 and 1960, over 80 percent of the crop production was sold.

In terms of acreage and value, cotton is the most important of these three cash crops. The importance of cotton in Mexican agriculture cannot be fully appreciated on the basis of area harvested only. As a result of its high value per hectare, cotton's share in total value of farm output has been about two and one-half times its share in total area.

Since 1940 and particularly after 1945, a new era of growth was started in the production of cotton.²⁰ Area harvested increased rapidly to a peak in 1955 and declined afterward. The upward trend in yields continued until 1964. Production reached a peak in 1965 and declined thereafter, as acreage dropped from 793 thousand hectares in 1965 to 435 thousand hectares in 1970. Increases in yield and area were brought about by an expansion of irrigation and complementary inputs. Yield variability was decreased at the same time that yield level was increased.

A major factor in the expansion of cotton production was the increase in demand in the international market, which was associated with World War II, the Korean War and the U.S. agricultural policies that guaranteed parity prices for U.S. producers and restricted output and exports. Thus other

²⁰ Mainly in the northern areas--Matamoros, La Laguna, the Mexicali Valley and Sonora--all of which have desert or semidesert climate.

countries expanded their output and exports. This external situation coincided with the internal programs of the Mexican government to expand irrigation in the northern part of Mexico. In 1960, of 752,000 hectares of cotton harvested, 80.3 percent, that is, 603,700 hectares were irrigated. The yields in the irrigation districts were from two to four times higher than the average yield in Mexico (See Table 36). Production in these newly irrigated areas also received financial and technological support from private sources in the U.S. In addition to irrigation and the increase in international demand, the successive devaluations of the Mexican peso placed exporters in a favorable competitive position in the cotton export market.²¹ Consequently, cotton, which in 1940 made up only 5 percent of the total value of agricultural exports, accounted for 45 to 55 percent²² of the value of agricultural exports after 1950. During 1941 to 1960 the value of crop exports increased 9.1 percent annually, mainly accounted for by cotton, while the exports in general increased at the lower rate of 4.4 percent [Solis, 1970, p. 127]. In 1940 only

²¹During the 1895 to 1904 period, it was reported that Mexico imported cotton, not due to lack of factories but due to the lack of sufficient cotton production [Lopez Rosado, 1959, p. 134].

²²These increases occurred despite the fact that the cotton industry was working mainly with antiquated equipment [Terres Camargo, 1959, pp. 138-139].

11 percent--110,000 tons--of the cotton production was exported; in 1965, 75 percent--1,516,000 tons--was exported--an increase of more than 10 times the quantity exported in 1940.

The decreases in production in the period 1959 to the present were a result of the decrease in external demand and consequently lower international prices as the U.S. instituted export subsidy payments,²³ and to the Mexican policies of guaranteed prices for crops produced for domestic consumption in which the prices of corn and wheat were raised in relation to those of cotton. The Mexican government is concerned about the future prospects for cotton not only on account of its foreign exchange contribution but also due to its contribution to the agricultural employment situation (cotton production is more labor intensive than many other crops) and to the byproduct of cottonseed which has been an important source of vegetable oil and high protein meal.

Sugarcane production continued to increase during this period (1959 to present). Until around 1950, the increase in production came almost entirely from an expansion in

²³Some Mexican authors accused the U.S. of dumping cotton since 1956 as it was offered for sale in the international market at lower prices than those prevailing in the U.S., and on easy payment terms ["Editorial," 1959, pp. 125-126]. To reduce the effects of these international problems the Mexican government gave a rebate of 97 percent of the export tax on the cotton crop since 1966.

acreage. While acreage continued to increase, there has been some increase in yield also. In 1960, 35 percent of the total area of sugarcane harvested was irrigated. In 1960, fertilizers were used on only 3 percent of the area harvested. In the period 1950 to 1960, the production of sugarcane increased at an average annual rate of 6.8 percent and the rate of growth was somewhat lower since 1959.²⁴

Sugarcane production in Mexico, until the U.S. discontinued the Cuban quotas in 1960, was mainly for domestic consumption. Until the Mexican Revolution, there was a tendency toward overproduction in the Mexican sugarcane industry as consumption was very low among the Indians and the rural population in general. This tendency toward overproduction was reversed by the Revolution in a destructive way as several sugar factories were destroyed. There was a sharp reduction in prices in the 1930's. The sugar producers formed an association, Azucar, S.A. After receiving official recognition by the Mexican Federal Government as a national industry, the name was changed to Union Nacional de Productores de Azucar, S.A. (UNPASA). UNPASA specialized in the industrial field. Its members were owners of "ingenios" (sugar factories) but they were directly in contact with the

²⁴In 1955/56, the sugarcane crop was adversely affected by meteorological phenomena ["Mexico en el Mercado Americano del Azucar," 1959, p. 146].

agricultural aspect of sugar production. They provided credit to the farmers who supplied their factories.

As a result of the production restrictions imposed on UNPASA producers and the growing consumer demand, Mexico imported sugar during World War II, and barely satisfied the domestic consumption before 1947. After that year UNPASA worked toward its main purpose, namely, to obtain annually the production needed to supply the normal consumption of the country.

Sugar production increased substantially after World War II mainly due to an expansion in the area harvested in the North, which occurred as a result of a government sponsored program, particularly in Sinaloa and Tamaulipas. Irrigation allowed new areas to be cultivated. Also, flood control permitted new lands to be brought into cultivation in the southeastern part of Mexico--the traditional center of the sugar industry. The production situation improved so much that by the end of the 1950's and early 1960's, UNPASA suggested to Financiera Nacional Azucarera the suspension of credit until the excess supply could be reduced ["Causas y Efectos Inmediatos del Aumento en las Excedencias de Azucar," 1960, pp. 100-102].

The Cuban crisis allowed Mexico to increase its exports by way of a quota to the U.S. market. In 1961, Mexican sugar exports amounted to 31 percent of the total production. In 1950, Mexico had exported only 13 percent of total production.

The value of sugar exports in 1950 was U.S.\$2 million. In the first half of the 1960's the value of the sugar exports had increased to around U.S.\$55 to U.S.\$60 million and represented 12 percent of the total value of Mexican exports.

The prospects appeared so good in 1964 that plans were being made for the addition of eight new mills by 1969-70, but the subsequent drop in prices in the international markets discouraged that expansion. By 1968, the objectives were to reduce the rate of expansion to the quantity needed to meet domestic consumption and U.S. export quota. In 1970, for the first time in 12 years, the government announced a 48 percent increase in the retail price of sugar.

Coffee production has represented around 1.5 to 2.5 percent of the total crop area harvested and about 6.0 to 8.0 percent of the total value of all crops. Mexican coffee production is mainly for the external market. In 1940, 59 percent was exported; and in 1962, 67 percent was exported. Since 1940, coffee has represented around 14 to 16 percent of the total value of agricultural exports. In 1965, coffee exports had a value of U.S.\$73 million. As a result of these increases, Mexico increased its share of the international coffee market from around 2 percent in the 1930's to 3.8 percent in the 1960's [FAO, 1966, pp. 57-58].

The upward trend in coffee production was continued in this period, mainly a result of increases in acreage.

In the late 1940's and early 1950's there was an increase

in coffee prices, as the major markets isolated by World War II were reopened. It was not until the international market supply responded in the 1950's that international prices fell. By that time, international coffee agreements were placed in effect. The Mexican Coffee Institute, since 1963, has encouraged a diversification program in low yield plantations by means of credit for producing rubber and fruits.

Other products of significance that are produced for export are henequen, tomatoes, and tobacco; and recently, watermelons and strawberries. Additional data for a number of these crops are given in Tables 57 and 58.

The Yucatan peninsula has been the largest world producer of henequen, but since prices have been falling in the international market, no new henequen fields are being planted. The government has been encouraging diversification into cucumbers and has done intensive research to find other uses for the henequen fibers--such as fertilizer, animal feed and for making rugs.

The production of vegetables, and specifically tomatoes, has increased significantly. Both acreage and yield have increased. In the export market, tomatoes have been a rapidly growing product. Valued at U.S.\$9 million in 1950, tomato exports to the United States amounted to 358.7 million pounds with a value of U.S.\$52.0 million in 1966, and to 446.2 million pounds with a value of U.S.\$68.0 million in 1969.

The average rate of growth of tomato production was 7.6

Table 57. Area Harvested, Production and Yield of Selected Crops, Mexico, Selected Years from 1931 to 1961

Year	Rice			Tomato		
	Area	Yield	Production	Area	Yield	Production
	(ha.)	(kg./ha.)	(metric tons)	(ha.)	(kg./ha.)	(metric tons)
1931	34,887	2,027	70,711	22,813	3,562	81,269
1936	30,220	2,099	76,037	15,138	4,137	62,631
1941	58,105	1,972	114,562	26,115	4,648	121,386
1946	68,988	1,929	133,096	42,115	5,680	239,216
1951	98,895	1,727	170,746	56,842	6,223	353,735
1956	107,966	2,051	221,421	62,637	5,782	362,170
1961	136,962	2,200	301,364	63,044	6,633	418,150

Year	Potato			Henequen		
	Area	Yield	Production	Area	Yield	Production
	(ha.)	(kg./ha.)	(metric tons)	(ha.)	(kg./ha.)	(metric tons)
1931	12,354	3,679	45,453	97,729	1,140	111,443
1936	13,941	4,796	66,857	93,116	1,055	98,212
1941	22,129	4,298	95,115	115,289	916	195,659
1946	27,575	4,598	126,790	139,549	837	116,777
1951	30,268	4,245	128,493	143,016	684	97,820
1956	37,782	5,654	213,617	152,947	726	111,110
1961	46,746	7,021	328,199	174,273	905	157,755

Year	Tobacco		
	Area	Yield	Production
	(ha.)	(kg./ha.)	(metric tons)
1931	14,079	792	11,148
1936	17,610	876	15,430
1941	22,056	986	21,744
1946	35,768	991	35,435
1951	35,308	1,003	35,411
1956	35,328	1,212	42,813
1961	52,549	1,316	69,158

Source: Loredó G., Joaquín "Producción y Productividad Agrícolas," Mexico: 50 Años de Revolución, Vol. 1, La Economía (Mexico, D.F.: Fondo de Cultura Económica, 1960), pp. 148-155.

Table 58. Indexes of Area Harvested, Yield, Production of Selected Crops, Mexico, Selected Years, from 1931 to 1961^a

Year	Rice			Tomato		
	Area	Yield	Production	Area	Yield	Production
1931	100.0	100.0	100.0	100.0	100.0	100.0
1936	103.8	103.6	107.5	66.4	116.1	77.1
1941	166.5	97.3	162.0	110.1	130.5	149.4
1946	197.7	95.2	188.2	184.8	159.5	294.4
1951	283.5	85.2	241.5	249.2	174.7	435.3
1956	309.5	101.2	313.1	274.6	162.3	445.6
1961	392.6	108.5	426.2	276.4	186.2	514.5

Year	Potato			Heneguen		
	Area	Yield	Production	Area	Yield	Production
1931	100.0	100.0	100.0	100.0	100.0	100.0
1936	112.8	130.4	147.0	95.3	92.5	88.1
1941	179.1	116.8	209.1	118.0	80.4	94.8
1946	223.2	125.0	278.3	142.8	73.4	104.8
1951	245.0	115.4	282.4	146.3	60.0	87.8
1956	305.8	153.7	469.6	156.5	63.7	100.0
1961	378.4	190.8	722.1	178.3	79.4	141.6

Year	Tobacco		
	Area	Yield	Production
1931	100.0	100.0	100.0
1936	125.1	110.6	138.4
1941	156.7	124.5	195.0
1946	254.1	125.1	317.9
1951	250.8	126.6	317.6
1956	313.7	153.0	480.1
1961	373.2	166.2	620.4

^a1931=100

Source: Table 57.

percent per annum in the 1959-70 period. One-half of the U.S. imports of vegetables from Mexico are now accounted for by tomatoes. Peppers and cucumbers make up most of the remainder. Most of the tomatoes for export are grown in the State of Sinaloa. Green and vine-ripe varieties yield about four times greater than the yield of those grown before 1956. The construction of better transportation facilities accelerated exports of winter fresh vegetables to the U.S. During the winter of 1969, the U.S. Dept. of Agriculture issued grade and size regulations for the import of Mexican tomatoes as a marketing order went into effect for shipment of U.S. domestic tomatoes. Afraid of future U.S. import restrictions, Mexican producers attempted voluntary restrictions of tomato shipments to the U.S.

Increases in strawberry production have also been directly related to the U.S. market. Up to 1949, production amounted to only 3.5 million pounds. New freezing plants were established in the 1950's which stimulated production. In 1956, 11.2 million pounds were exported to the U.S. Production continued to expand as export opportunities to the U.S.—80 percent frozen, 20 percent fresh—expanded in the 1960's. Mexican strawberries for freezing cost half of that of the U.S. berries, and sugar and labor packing costs are lower. To encourage production, the big export firms financed all cash costs of the strawberry production and furnished extension workers. Yields have been rather stable

and increases in production have been due mainly to increases in area under cultivation (Table 59).

There was a phenomenal growth in grain-sorghum during this period: production increased from 179 thousand metric tons in 1959 to 1.7 million metric tons in 1970. Sorghum demand, mainly for animal feed was increasing and prices of sorghum in relation to prices of cotton and corn resulted in shifts to sorghum. Double cropping of sorghum with wheat has also been a factor in the increasing sorghum acreage.

Tobacco acreage and yield, and consequently production, continued to increase in this period. Production grew at 4.2 percent annually during the 1959-1970 period.

Rice has been considered by Mexican consumers, in some instances, as a luxury good. Generally, the basic food of the Mexicans was "tortillas," made of corn with chile, and if there was the capacity to buy something else, it would be beans and meat. After these items, if money were available, then rice, potatoes or some other vegetable was purchased. Rice production, as the population and the per capita income increased, has also increased. In 1961, 301,364 metric tons of rice were produced, 326 percent more than in 1931. Almost all the increase was due to the increase in the area harvested. Yields have, on the average, fluctuated around 2,000 kgs./ha. In 1966 the average yield of rice in Mexico was 2,200 kgs./ha., while the yields in almost all the irrigated districts, where rice was cultivated, were much

Table 59. Strawberry Acreage, Production, and Yield,
Mexico, 1960-61 to 1965-66

Year	Acreage (acres)	Production (short tons)	Yields (ton per acre)
1960-61	4,400	22,100	5.0
1961-62	4,900	25,400	5.2
1962-63	5,100	28,100	5.5
1963-64	5,300	30,500	5.8
1964-65	7,000	42,000	6.0
1965-66 ^a	11,000	55,000	5.0

^aEstimated.

Source: Cook, A.C., "Mexican Strawberry Output and Export Still Soaring," Foreign Agriculture, Vol. 4, No. 21 (May 23, 1966), p. 70.

higher than the national average [De la Pena, 1964, p. 542].

The production of potatoes increased 622 percent between 1931 and 1961, due to increases of 278 percent in the area harvested and 91 percent in yield. The annual rate of growth was 6.8 percent for the 1959-1970 period. The price of potatoes has always been higher than the price of corn despite the fact that potatoes are inferior in nutrients. There was also a steady growth in output of oranges and watermelons in the 1959-1970 period.

The Mexican livestock industry has been confronted with several obstacles. In the 1940's it was affected by several epidemics, aftose fever among them, but by the late 1950's it had recuperated. In 1964, the Gross Domestic Product in Mexico from the livestock sector in 1950 pesos was 5.1 billion pesos, and the large types of livestock consisted of 37.2 million heads of which 26.8 million were cattle, and 5.8 million were horses. The small animal groups contained 25 million heads, including 9.3 million hogs and 9.2 million goats. The population of hogs did not significantly increase until 1960. From that year until 1964, the hog population increased over 3 million heads. The prices of hogs declined in 1957 and 1958, but in 1960 the government implemented a program to guarantee prices and this action stimulated production.

Although there has been growth in the livestock sector²⁵, the rate was not as high as the growth rate in the crop sector. Several institutional factors have limited the livestock sector. There were extensive farms that did not receive certificates of unaffectability and were still subject to insecurity. Consequently, ranchers were reluctant to improve the quality and quantity of their herds and the carrying capacities of their lands. Cattle thefts created additional uncertainty, and, as several Mexican economists have pointed out, lack of credit available for cattle raising was one of the factors limiting its development. Selective increases in credit in areas unsaturated with cattle were suggested and it was also pointed out that 50 percent of the Mexican countryside was suitable for cattle raising but hardly so for any other purpose [Moyo, 1959, pp. 33-36]. In 1969, the World Bank (IBRD) provided a loan of US\$65 million to Mexico with the specific purpose of opening cattle areas in Chiapas and Tabasco. Other problems are lack of efficient grading systems and government ceiling prices that have been imposed in attempts to hold down prices to consumers. Low domestic prices, however, have encouraged exports to the U.S.

²⁵During colonial times, the Crown made efforts to promote livestock production through the institution of Mesta--an official organization of ranchers in charge of its regulations and development [Dusenberry, 1963].

Shifts in the Relative Composition of Output

There have been important shifts in the relative position of the different crops. The share of corn in total value of crop production decreased--especially between 1949-1951 and 1959-1961; cotton increased sharply between 1939-1941 and 1949-1951; and the relative share of "other crops" increased between 1949-1951 and 1959-1961 (Tables 60 and 61).

Between 1950 and 1967, there was very little change in the composition of output in more aggregate form, i.e., crops, livestock, forestry, and fishing (Table 62).

Table 60. Main Crops: Area Harvested and Percentage Distribution of Area and Value, Mexico, Annual Average of Selected Years, 1939-1961

Crops	Years					
	1939-1941		1949-1951		1959-1961	
	1,000 hectares	Percent Area Value ^a	1,000 hectares	Percent Area Value ^a	1,000 hectares	Percent Area Value ^a
Beans	859	10.8	4.3	11.7	1,451	11.7
Coffee	121	1.5	7.9	1.5	299	2.4
Corn	5,121	64.6	37.6	58.5	6,479	52.5
Cotton	277	3.5	7.8	6.8	815	6.6
Sugar	103	1.3	4.4	1.8	336	2.7
Wheat	582	7.4	7.0	5.8	871	7.1
Others	871	10.9	31.0	13.9	1,988	16.1
Total	7,934	100.0	100.0	100.0	12,339	100.0

^aAt constant 1958=100 prices.

Source: Secretaria de Agricultura y Ganaderia et al. Proyecciones de la Oferta y la Demanda de Productos Agropecuarios en Mexico, a 1962, 1970 y 1975 (Mexico, D.F.: 1966), p. 183.

Table 61. Percentage Distribution of Product Groups^a, by Area Harvested and by Value of Output, Mexico, Average 1939-1941, 1949-1951 and 1959-1961

Product Group	Area Harvested			Value of Output ^b		
	1939-41	1949-51	1959-61	1939-41	1949-51	1959-61
	-----percent-----			-----percent-----		
Cereals	74.7	68.1	64.2	46.8	42.1	37.3
Other Starches	0.4	0.4	0.5	1.3	1.1	1.3
Pulses	12.6	13.3	13.4	5.7	5.4	5.8
Vegetables	0.9	1.2	1.3	3.6	4.7	3.6
Short-cycle Fruit	0.2	0.2	0.4	0.9	0.9	1.5
Long-cycle Fruit	1.1	1.4	1.7	13.2	10.5	9.7
Sugarcane	1.3	1.8	2.7	6.8	7.7	10.1
Oil Seeds ^c	1.7	2.9	3.6	3.9	6.4	7.6
Coffee, Cacao, Tobacco	1.9	2.1	3.4	7.3	5.6	6.7
Textile Fibers	4.8	8.1	8.0	7.9	13.7	14.2
Alfalfa	0.5	0.5	0.7	2.6	2.0	2.2
Plantation Crops ^d	4.2	4.9	6.8	21.5	16.8	18.1
Cultivation Crops	95.8	95.1	93.2	78.5	83.2	81.9

^aIndividual items in order of importance:

Cereals - corn, wheat, sorghum, rice, barley, oats.

Other starches - potatoes, sweet potatoes.

Pulses - beans, chick peas, broad beans, others.

Vegetables - tomatoes, onions, dry chillies, garlic, peas, others.

Fruits - oranges, bananas, pineapples, mangoes, watermelon, avocados, others.

Oilseeds - cottonseed, copra, sesame, others.

Textile fibers - cotton, henequen fiber.

^bValue at average 1958-60 farm prices.

^cIncludes cottonseed.

^dLong cycle fruits, copra, oilpalm, kernels, cacao, coffee, and henequen.

Source: Secretaria de Agricultura y Ganaderia et al. Projections of Supply and Demand for Agricultural Products in Mexico to 1965, 1970 and 1975. (Jerusalem, Israel: 1966), p. 84.

Table 62. Agricultural National Product^a, Mexico, 1950, 1960, 1965 and 1967

Activity	1950		1960		1965		1967	
	Mil. Pesos	%	Mil. Pesos	%	Mil. Pesos	%	Mil. Pesos	%
Crops	5,999	65.0	9,178	65.5	11,579	67.0	11,999	66.2
Livestock	2,903	31.4	4,450	31.8	5,267	30.5	5,669	31.3
Forestry	263	2.8	254	1.7	279	1.7	298	1.6
Fishing	77	0.8	136	1.0	147	0.8	162	0.9
Total	9,242	100.0	14,018	100.0	17,272	100.0	18,128	100.0

	Average Annual Rate of Change		Index ^b	
	1950-60	1960-67	1960	1967
	-----percent-----			
Crops	4.3	3.9	152.9	200.0
Livestock	4.3	3.5	153.3	195.1
Forestry	0.3	2.3	96.6	113.3
Fishing	7.0	2.5	176.6	210.4

^aIn constant 1950 prices.

^b1950=100.

Source: Nacional Financiera, S.A. La Economía Mexicana en Cifras (Mexico, D.F.: Nacional Financiera, S.A., 1965); Banco de Mexico Informe Anual, 1967 (Mexico, D.F.: 1968)

CHAPTER VI

AGRICULTURE'S CONTRIBUTIONS TO MEXICAN ECONOMIC DEVELOPMENT

In the development process, the agricultural sector is expected to: (a) provide adequate food supply for itself and for an increasing non-farm population with rising incomes; (b) provide increasing quantities of raw materials for industry; (c) provide foreign exchange for increasing capital imports; (d) provide savings as a means of financing expansion of non-farm sectors; (e) provide for a transfer of labor to those sectors that are increasing; and (f) provide an expanding market for farm inputs, consumer goods and services supplied by the non-farm sectors.

Production of Food and Raw Materials

Industrial crops in 1960 had increased more than five times the 1925-29 base level. Production of food crops in 1960 was more than three times the 1925-29 level (Table 63). Production of food and of all agricultural products continued to increase through 1971, with output of food increasing faster than total agricultural output (Table 64).

Crop production per capita decreased during the Revolution and did not regain the pre-Revolution level until

Table 63. Indexes of Crop Production:^a Total, Food Crops, and Industrial Crops, Mexico, Selected Years, 1925 to 1960

Period	Total Crops	Food Crops ^b	Industrial Crops ^c
1925-29	100.0	100.0	100.0
1930-34	93.3	97.9	82.9
1935-39	105.9	102.1	114.8
1940-44	129.5	120.1	151.7
1945-49	160.7	147.3	192.3
1950-54	247.3	202.1	352.0
1955-59	362.9	286.7	541.1
1960	385.3	322.6	532.8

^a1925-29=100.

^bFood crops include, cereals: rice, barley, corn, wheat; other foods: peanuts, chile (dry), chile (green), beans, garbanzos (chick peas), potatoes, bananas (roatan), bananas (other types), tomatoes, lima beans; tree and shrub crops: cacao, coffee, lemons, oranges; forage crops: alfalfa.

^cIndustrial crops: sesame, cotton (fiber), sugarcane, henequen, tobacco, cottonseed, copra.

Source: Parks, Richard W., "The Role of Agriculture in Mexican Economic Development," Inter-American Economic Affairs, Vol. 18, No. 1, (Summer 1964), p. 6.

Table 64. Indexes of Agricultural Production, Mexico, 1959 to 1970

Year	Total		Per Capita		Population Index
	Crops	Agriculture	Food	Agriculture	
-----1961-65 = 100-----					
1959	79	79	82	92	85.0
1960	84	84	84	95	87.6
1961	86	88	88	94	93.5
1962	91	93	91	96	96.8
1963	97	98	98	98	100.0
1964	108	107	107	104	103.3
1965	117	114	115	107	106.7
1966	118	116	120	105	110.2
1967	121	118	124	104	113.8
1968	125	122	126	104	117.6
1969	115	117	123	96	121.5
1970	129	128	140	102	125.5
1971	137	135	146	104	129.6

Source: U.S. Dept. of Agriculture, Economic Research Service, Indexes of Agricultural Production for the Western Hemisphere. ERS - Foreign 264, 44 (Washington, D.C.: March 1972, Jan. 1966).

after 1940 (Table 65).¹ Between 1940 and the middle of the 1960's per capita production of both total agriculture and food increased rapidly (Tables 64 and 65). Since 1964, per capita production of food has continued to increase despite the high population growth rate. The drop in production in 1969 was attributed to an extensive drought.

From 1945 to 1960, food production increased at a faster rate than demand when the changes in population and per capita income were considered as demand shifters (Table 66). From 1940 to 1944 the demand for food increased faster than production and the agricultural price index rose in relation to the general price index, subsequently it declined (Table 67).

From 1951 to 1966, the index of crop prices increased less than the general price index but the increase in the livestock price index exceeded the increase in the general price index (Table 68). The demand for livestock and livestock products was increasing faster than supply.

Per capita production of staple foods--corn, wheat, beans, and rice--remained almost constant during the 1930's --the period of intensive land distribution by President

¹During the last decade of the Diaz regime (1900-1910), crop production per capita increased significantly at 3.9 percent, but its main components were exports of industrial crops--such as henequen, cotton, and tobacco. Food crop production for domestic consumption was probably not keeping pace with the population growth.

Table 65. Population and Crop Production Indexes, and Annual Rates of Growth, Mexico, Selected Years, 1900 to 1964

Year	(1)	(2)	(3)	(4)
	Population (Thous. persons)	Population Index	Crop Production Index (Five yr. moving ave.)	Crop Production per Capita Index [(3) as % of (2)]
1900	13,607	100.0	100.0	100.0
1910	15,160	111.4	163.1	146.4
1921	14,335	105.3	82.8	78.6
1930	16,553	122.1	104.7	85.8
1940	19,654	145.9	134.9	92.5
1950	25,791	189.5	238.7	125.9
1960	34,923	256.6	429.5	167.3
1964	39,642	291.3	548.9	188.4
Average Annual Increase				
	(5)	(6)	(7)	(6)-(5)
	Population	Crop Production	Crop Production Per Capita	
1900-10	1.1	5.0	3.9	3.9
1910-21	-0.5	-1.7	-1.2	-1.2
1921-30	1.5	2.6	1.1	1.1
1930-40	1.9	2.6	0.7	0.7
1940-50	2.7	5.9	3.2	3.2
1950-60	3.1	6.0	2.9	2.9
1960-64	3.3	6.3	3.0	3.0

^a1900=100.

Sources: Column (1) from Nacional Financiera, S.A. La Economía Mexicana en Cifras, (Mexico, D.F.: Nacional Financiera, S.A., 1965), p. 19. Column (3) from Table 10. Other columns computed from Columns (1) and (3).

Table 66. Annual Rates of Increase in Food Production and Food Demand, Mexico, Five-Year Intervals, 1940 to 1959

Period	Average Annual Increase			
	Population	Income	Food	
			Demand	Production
-----percent-----				
1940-44	2.64	2.63	5.27	3.25
1945-49	2.74	1.05	3.79	4.22
1950-54	2.82	0.89	3.71	6.50
1955-59	3.31	1.36	4.67	7.21

Source: Horton, D.E., "Land Reform and Economic Development in Latin America, 'the Mexican Case,'" Illinois Agricultural Economics Bulletin, Vol. 8, (January 1968), p. 22.

Table 67. Indexes of Prices, Rural Agricultural and General Retail, Mexico, 1939 to 1962

Year	Rural Prices of Agricultural Products (1)	General Retail Prices ^a (2)	Ratio [(1)÷(2)]
-----1939=100-----			
1939	100.0	100.0	1.00
1940	91.4	104.2	0.88
1941	106.9	112.6	0.95
1942	157.3	137.7	1.14
1943	167.1	180.0	0.93
1944	240.8	258.6	0.93
1945	262.9	302.4	0.87
1946	277.1	391.2	0.71
1947	300.1	422.1	0.71
1948	290.7	423.0	0.69
1949	280.2	465.2	0.60
1950	372.9	496.6	0.75
1951	482.2	610.0	0.79
1952	479.7	738.0	0.65
1953	535.5	708.9	0.76
1954	555.0	776.2	0.72
1955	564.0	895.5	0.63
1956	611.6	925.2	0.66
1957	671.4	966.6	0.69
1958	681.0	1,041.9	0.65
1959	667.4	1,096.5	0.61
1960	720.1	1,130.1	0.64
1961	774.3	1,138.1	0.68
1962	719.6	1,149.6	0.63

^aRetail price index in Mexico City.

Source: Aguilera Gomez, Manuel, La Reforma Agraria en el Desarrollo Economico de Mexico (Mexico, D.F.: Instituto Mexicano de Investigaciones Economicas, 1969), p. 221.

Table 68. Wholesale Price Indexes^a in Mexico City, 1951, 1960 and 1966

Category	1951	1960	1966	Percent Change 1951 to 1966
General Index	89.9	137.5	152.8	70.0
Crops	102.4	128.0	156.4	52.7
Animal Products	86.0	173.8	196.3	128.2

^a1954=100.

Source: Banco de Mexico, Informe Anual, 1966, (Mexico, D.F.: 1967), p. 63.

Cardenas. However, per capita production increased very rapidly thereafter and by 1963, 235.6 kgs. of staple food crops per capita were available from domestic sources to the Mexican population, more than twice the quantity available in 1930 (Table 69).

Foreign Exchange

The growth of agriculture contributed directly to the earning of foreign exchange through exports and indirectly to the balance of payments by saving foreign exchange that otherwise would have been needed to purchase imports for satisfying the increases in internal demand. Mexico is not an exception among Latin American countries with problems in the balance of payments. The size of the deficit has increased continuously since 1939 (Table 70).

The agricultural exports at 1950 export prices in the period of 1937 to 1941 amounted to an annual average of 812.7 million pesos and represented 34.4 percent of the total value of exports (Table 71). From 1947 to 1956, agricultural exports increased substantially, both in terms of total value and as a percentage of the total value of exports.

Since 1956, due to the fall in international prices of the main agricultural products of Mexico (cotton and coffee), the share of agricultural exports in total value of exports fell from the levels of over 50 percent in the earlier 1950's

Table 69. Staple Food Production, Mexico, Selected Years, 1930 to 1963

Year	Corn	Wheat	Beans	Rice	Total	Population	Per Capita
	-----1,000 metric tons-----					(millions)	(kg.)
1930	1,377	370	83	75	1,905	16.55	115.1
1940	1,640	464	97	108	2,309	19.65	117.5
1950	3,122	587	250	187	4,146	25.79	160.7
1960	5,386	1,190	528	328	7,432	34.92	212.8
1963	6,424	1,786	700	266	9,176	38.95	235.6

Source: Freithaler, William O. Mexico's Foreign Trade and Economic Development (New York: Praeger, 1968), p. 21.

Table 70. Principal Elements of Balance of Payments, Mexico,
Selected Years, 1939 to 1964

Item	1939-50	1951-57	1958-62	1963	1964
—Average annual value in millions of dollars—					
Receipts	407	1,156	1,401	1,703	1,837
Payments	448	1,209	1,584	1,806	2,243
Balance on Current Accounts	- 41	- 53	- 183	- 103	- 406

Source: Freithaler, William O., Mexico's Foreign Trade and Economic Development (New York: Praeger, 1960), p. 42.

Table 71. Value of Total and Agricultural Exports of Mexico,
Annual Average, Selected periods 1937-1956

Period	Total Value	Agriculture	
		Value	Percent of Total
	--Million pesos at 1950-- export prices		----percent----
1937-41	2,360.9	812.7	34.4
1942-46	3,108.1	1,021.1	32.9
1947-51	4,154.7	1,650.7	39.7
1952-56	5,727.5	3,109.9	54.3

Source: United Nations, Economic Survey of Latin America,
(New York: 1957), p. 288.

although the total value continued to increase (Table 72). The livestock sector, which represented only 1 to 3 percent of the total value of exports up to 1957 increased significantly after that year.²

In 1940 only 8.5 percent of the value of agricultural production was exported--9 percent of the total value of the crop production and 8.3 percent of the value of animal production. By 1950, the share of total agricultural products exported increased to only 9.1 percent but this represented a large increase in the share of crops exported which was off-set by a reduction in the livestock component (Table 73). The reduction in the share of animal production exported was due to diseases.

The main crops exported are cotton, coffee and sugar. The value and relative shares of cotton and coffee have declined since the middle 1950's (Table 74). The value and share of sugar have increased. These changes in cotton and sugar are related to the policies implemented by the U.S. in the late 1950's. The changes in coffee are associated with the international coffee market situation.

Corn and wheat were exported in the 1960's. U.S.\$22.0 millions were earned from corn exports in 1960 and U.S.\$77.2

²Between 1947-1952 and 1953-1954 meat could not be exported from Mexico due to disease.

Table 72. Value of Total Crop and Livestock Exports, 1950 to 1964

Year	Value of Exports		Percent of Value of Total Exports	
	Total	Crops	Livestock	Agricultural
	Million U.S. dollars		percent	
1950	493.4	231.4	2.5	46.8
1951	591.6	265.9	12.3	44.9
1952	625.3	291.8	17.8	46.6
1953	559.1	286.3	12.4	51.2
1954	615.8	318.1	5.6	51.6
1955	738.6	375.0	19.9	50.8
1956	807.2	402.7	9.4	49.9
1957	706.1	311.8	25.1	44.1
1958	709.1	322.1	55.3	45.4
1959	723.0	323.0	50.3	44.7
1960	738.7	307.5	45.4	41.8
1961	803.5	282.7	61.0	35.2
1962	899.5	348.1	78.3	38.7
1963	936.0	313.6	67.3	33.5
1964	1,023.5	387.4	40.0	37.8

Source: Nacional Financiera, S.A., La Economía Mexicana en Cifras (Mexico, D.F.: Nacional Financiera, S.A., 1965).

Table 73. Agricultural Exports as Percentage of Value of Agricultural Production

Item	Years		
	1940	1950	1960
	-----Percent-----		
Total Agriculture	8.5	9.1	14.3
Crops	9.0	14.5	22.1
Animal Products	8.3	1.5	4.0

Source: Secretaria de Agricultura y Ganaderia et al.
Proyecciones de la Oferta y la Demanda de Productos
Agropecuarios en Mexico 1965, 1970 y 1975,
 (Mexico, D.F.: Banco de Mexico, 1965), p. 36.

Table 74. Cotton, Coffee and Sugar Exports: Value and Percentage of Value of Total Exports, Mexico, Selected Years, 1940 to 1964

Year	Cotton ^a		Coffee		Sugar ^b	
	Value	Share	Value	Share	Value	Share
	(Mil. U.S.\$)	(%)	(Mil. U.S.\$)	(%)	(Mil. U.S.\$)	(%)
1940	c	c	4	3	c	c
1950	139	26	45	8	c	c
1955	252	32	104	13	c	c
1956	263	31	105	12	c	c
1957	173	23	106	14	8	1
1958	190	27	79	11	11	2
1959	198	26	63	8	15	2
1960	157	20	71	9	53	7
1961	160	19	72	9	69	8
1962	218	23	70	7	43	5
1963	196	20	49	5	60	6
1964	169	16	87	8	77	7

^aRaw cotton only.

^bRaw and refined.

^cNegligible.

Source: Freithaler, William O., Mexico's Foreign Trade and Economic Development (New York: Praeger, 1968), p. 143.

millions in 1965. In 1965, U.S.\$41.6 millions were earned from wheat exports. These exports were possible through government subsidies and the increased output of these crops. Recently, the government has changed national policies in an attempt to eliminate subsidies in the production for export and exports have declined (Table 75). In recent years tomatoes, strawberries, and cantaloupes have become important exports to the United States (Table 76).

Over half of the Mexican agricultural exports goes to the U.S. (Table 77). Livestock and meat products are Mexico's fourth largest export to U.S., amounting to over \$50 million per year since 1960--increasing from 39.0 million lbs. of beef and veal in 1960 to 65.6 million lbs. in 1968, and from 390,888 heads of cattle and calves to 702,472 heads in 1968. Mexico controls the level of meat and live animal exports to U.S. through a license system and since 1964 an agreement has been in effect between the U.S. and Mexico that limits meat shipments to the U.S. Similar agreements have been in effect between the U.S. and Australia, New Zealand and Ireland.

Agricultural imports have not been important in Mexico, especially since 1940. Imports of agricultural products have been falling. In 1958-60, on the average, there was a favorable balance of trade for agriculture of 2.5 billion current pesos; in 1963-65, this balance was increased to 6.7 billions in current pesos [Secretaria de Agricultura y

Table 75. Selected Agricultural Exports, Mexico, 1965 to 1970

Item	1965	1966	1967	1968	1969	1970
	-----1,000 tons-----					
Corn	1,347	852	1,252	896	788	300
Wheat and wheat flour	686	47	212	3	247	-
Rice milled	-	-	-	44	23	26
Coffee, green or roasted	78	86	74	95	94	100
Cotton, raw	352	463	303	316	370	295
Sugar, raw basis	527	478	568	641	604	590
Tobacco, unmanufactured	5	10	8	4	8	8
Beef, veal, excludes fat	34	43	30	45	49	50

Source: U.S. Dept. of Agriculture, Economic Research Service, The Agricultural Situation in the Western Hemisphere. Foreign Agricultural Economic Report Numbers 222, 261, 312, (Washington, D.C.: 1968, 1969, 1970).

Table 76. Mexican Exports of Tomatoes, Strawberries and Cantaloupes to the United States, 1956 to 1965

Year	Tomatoes		Strawberries		Cantaloupes
	Fresh	Paste, Sauce	Frozen	Fresh	
		& Canned			
-----million pounds-----					
1956	69.0	2.7	11.2	a	51.9
1957	100.4	a	13.7	a	49.7
1958	226.2	a	14.4	a	43.6
1959	240.4	a	14.1	a	56.2
1960	251.8	0.3	25.0	a	79.3
1961	156.1	3.7	29.8	0.6	79.6
1962	233.2	5.0	32.3	0.9	97.8
1963	240.0	a	34.6	3.4	110.4
1964	246.1	a	39.8	4.1	130.1
1965	265.5	2.6	51.8	5.8	146.5

^aNil or negligible.

Source: U.S. Dept. of Agriculture, Economic Research Service, Effects of Changes in Use of Seasonal Workers in U.S. - Mexican Agricultural Trade and Balance of Payments, ERS, Foreign 195 (Washington, D.C.: 1966), p. 14.

Table 77. Value of U.S. Agricultural Imports from Mexico,
1956 to 1970

Period	Value
	(million U.S. dollars)
Average 1956-59	182.1
1960	186.5
1961	260.4
1962	274.3
1963	257.8
1964	278.6
1965	269.7
1966	304.7
1967	328.8
1968	354.3
1969	435.1
1970	526.6

Source: Warden, Thomas A. "Farm Goods Share in Growth of Trade between Mexico and U.S." Foreign Agriculture, Vol. 9, No. 7 (Feb. 15, 1971), pp. 9, 10.

Ganaderia, 1963-1967].

Crop product imports, generally, have never been more than 5 percent, and recently not over 1 percent, of the total supply. A similar situation existed in the livestock sector. The agricultural imports in Mexico have been very sporadic, and occurred mainly as a result of natural disasters such as prolonged droughts (Table 78). Thus the agricultural sector has made a significant contribution to the earnings and savings of foreign exchange.

Financial Support for Non-farm Sectors³

Has the agrarian sector helped to finance the economic development of the other sectors of the Mexican economy? To determine whether the agricultural sector has been a net receiver or a net provider of funds in relation to the other sectors of the economy, the different channels through which funds are transferred between sectors must be examined. These channels include the fiscal system, the banking system, the price relations between sectors, and the balance of payments. A Mexican economist, Leopoldo Solis, has calculated the amount of taxes⁴ obtained from the agricultural sector and the amounts spent on it by the government for

³Information for this section was obtained from [Eckstein, 1969].

⁴Includes taxes from agricultural exports.

Table 78. Imports of Crops and Animal Products as a Percentage of Their Total Supply, Mexico, 1940 to 1962

Year	Crop Products	Animal Products
	percent	
1940	0.5	1.5
1941	2.4	1.5
1942	2.1	1.8
1943	4.9	1.7
1944	7.5	5.3
1945	5.2	4.3
1946	4.2	3.8
1947	3.6	2.2
1948	3.2	1.1
1949	2.9	1.5
1950	3.8	1.6
1951	4.1	1.6
1952	5.9	1.3
1953	5.6	1.6
1954	1.7	1.6
1955	0.3	1.3
1956	1.5	1.5
1957	4.3	1.2
1958	4.2	0.9
1959	0.9	0.9
1960	0.8	0.9
1961	0.3	1.0
1962	0.6	1.0

Source: Secretaria de Agricultura y Ganaderia et al.
Proyecciones de la Oferta y la Demanda de Productos Agropecuarios en Mexico 1965, 1970 y 1975
 (Mexico, D.F.: Banco de Mexico, 1965), pp. 26-27, 36.

the years 1942 to 1961.. In these 20 years, there were only five in which agricultural taxes exceeded government expenditures in the agricultural sector. The five years in which the taxes exceeded expenditures in agriculture were the years in which Miguel Aleman and Adolfo Ruiz Cortines were presidents of Mexico and they put more emphasis on the industrialization program (Table 79).

The large public expenditures of the government in agriculture were mainly in rural infrastructure--irrigation and dam projects, which played a significant role in agricultural growth despite the prolonged gestation period. From 1935 to 1952, the investments in the rural sector were mainly in irrigation--16 percent of the public sector's total investments in the economy. In 1953 to 1968, the share of investments declined to 12 percent in irrigation as the network of irrigation facilities were expanded to the point that alternatives offered higher returns. The public sector investments in roads was important also, and these have benefited the agricultural sector (Table 80).

From 1942 to 1962, the year-to-year situation is clear with reference to resources obtained from and channeled to agriculture. The net results for the period were against the agricultural sector--the private banking system obtained from the agricultural sector, 60.9 billion pesos (in 1960 prices) in excess of the amount channeled to that sector. In 1962, for example, the banking system obtained 10.8

Table 79. Total and Agricultural Taxes and Government Expenditures, Mexico, 1942 to 1962^a

Year (1)	Taxes		Share from		Expenditures		Share to Agriculture (7)	Agricultural Balance (8)=(6)-(3)
	Total (2)	Agriculture (3)	Agriculture (4)	-----mil. pesos-----	Total (5)	Agriculture (6)		
	-----mil. pesos-----	-----mil. pesos-----	-----percent-----	-----mil. pesos-----	-----mil. pesos-----	-----percent-----		-----mil. pesos-----
1942	2,457.5	379.2	15.4	3,744.2	620.3	16.5		241.1
1943	2,955.2	416.2	14.0	3,771.5	566.4	15.0		150.2
1944	3,010.3	340.2	11.3	3,561.5	620.9	17.4		280.7
1945	2,864.4	319.8	11.1	3,910.6	705.1	18.0		385.3
1946	3,187.9	305.1	9.5	3,469.2	556.7	16.0		251.6
1947	3,357.1	294.0	8.7	4,074.9	711.7	17.4		417.7
1948	3,360.9	305.5	9.0	4,790.6	641.1	13.4		335.6
1949	4,567.4	861.7	18.8	5,248.7	779.3	14.8		- 82.4
1950	4,767.1	834.8	17.5	5,273.3	659.2	12.5		-175.6
1951	5,922.2	1,025.0	17.3	6,011.7	745.9	12.4		-279.1
1952	6,254.5	967.4	15.4	7,843.1	1,300.7	16.5		333.3
1953	5,409.8	824.6	15.2	7,116.1	1,095.2	15.3		270.6
1954	5,993.6	1,181.3	19.7	8,130.8	1,392.5	17.1		211.2
1955	7,667.8	1,581.8	20.6	8,229.9	1,235.0	15.0		-346.8
1956	7,940.9	1,344.7	16.9	9,107.7	1,161.9	12.7		-182.8
1957	7,476.6	1,071.4	14.3	9,629.2	1,230.2	12.7		158.8
1958	7,825.9	1,053.6	13.4	10,354.1	1,252.8	12.1		199.2
1959	8,477.1	1,035.8	12.2	10,417.2	1,216.0	11.6		180.2
1960	9,301.2	1,003.9	10.7	11,794.9	1,278.6	10.8		274.7
1961	9,835.7	964.1	9.8	12,791.0 ^b	1,317.5 ^b	10.3 ^b		353.4
1962	-	-	-	13,479.8 ^b	1,462.6 ^b	10.8 ^b		-
Total	112,633.1	16,110.1	14.3	139,270.2	19,087.0	13.7		2,976.9

^aIn constant 1960 prices.^bNot included in totals.Source: Solis M., Leopoldo, "Hacia un Analisis General a Largo Plazo del Desarrollo Economico de Mexico" Demografia y Economia, Vol. 1, No. 1 (1967), p. 63.

Table 80. Investments in Public Sector, Mexico, 1935 to 1968

Category	1935-40	1941-46	1947-52	1953-68
	-----percent-----			
<u>Agricultural</u>	17.8	15.7	22.0	13.0
Irrigation	16.8	15.0	16.2	12.2
Other	1.0	.7	5.8	.8
<u>Industrial</u>	9.3	10.2	18.9	30.3
Commerce & Transportation	51.4	51.6	40.2	36.3
Roads	18.9	23.3	16.0	14.7
Railroads	29.4	26.0	21.3	16.0
Other	3.1	2.3	2.9	5.7
<u>Social</u>	8.3	12.9	13.3	14.3
Public Housing	-	-	1.5	1.5
Hospitals	.7	1.5	1.5	1.5
Schools & Research	2.4	1.2	3.0	2.5
Other	5.2	10.2	7.3	8.7
<u>Miscellaneous</u>	13.3	9.5	5.6	6.1
	-----million pesos-----			
Total	947	4,309	14,091	26,674

Source: Hertford, Reed, "Mexico: Its Sources of Increased Agricultural Output," in U.S. Dept. of Agriculture, Economic Research Service, Economic Progress of Agriculture in Developing Nations 1950-68, Foreign Agricultural Economics Report, No. 59 (Washington, D.C.: USDA, 1970), p. 92.

billion pesos from agriculture--17.1 percent of the total resources obtained by the banking system--while it channeled 7.0 billion pesos to the agriculture sector--a negative balance of 3.8 billion pesos (Table 81). These negative balances for agriculture are far in excess of the positive balances that occurred in the fiscal sector (See Table 79).

The large expenditures in rural infrastructure increased the productivity of Mexican farms, at a time when rural savings were exceeding new attractive private investment opportunities in agriculture. The private banking system transferred this surplus to borrowers in other sectors of the Mexican economy.

The transfer of funds through the price system cannot be computed, but an idea of the direction in which the net flow moved is indicated by the movement in the indexes of prices. An analysis of how the prices of the agricultural products changed in relation to the rest of the prices in the economy is not an easy task in any underdeveloped country and Mexico is no exception. Prices paid by farmers are not available. The best alternative data are estimates of parity ratios--prices received (rural prices) over prices paid (wholesale price index of Mexico City)--made by the Banco Nacional de Credito Ejidal. The parity ratio was 1.14 in 1942, indicating that the prices received by farmers had increased more than those paid. There was a rapid decline to a low of 0.60 in 1949 and subsequently this

Table 81. Total and Agricultural Resources Obtained and Channeled by the Banking System, Mexico, 1942 to 1962a

Year (1)	Resources Obtained		Resources Channeled		Share to Agriculture (7)	Agricultural Balance (8)=(6)-(3)
	Total (2)	Agriculture (3)	Total (5)	Agriculture (6)		
	mil. pesos	percent-	mil. pesos	percent-	mil. pesos	
1942	15,775.2	3,533.3	13,332.5	2,106.7	15.8	-
1943	18,663.7	3,994.0	13,932.4	2,133.6	15.3	-
1944	19,478.1	3,954.1	14,902.0	2,495.2	16.7	-
1945	20,872.1	3,861.3	15,193.3	1,729.3	11.3	-
1946	18,664.5	3,490.3	15,191.8	1,454.6	9.6	-
1947	18,622.3	3,631.3	16,632.5	1,625.1	9.7	-
1948	20,945.0	4,230.9	18,916.2	1,696.3	8.9	-
1949	23,260.9	4,815.0	20,281.2	1,873.3	9.2	-
1950	26,047.3	5,417.8	21,110.3	2,003.2	9.5	-
1951	26,208.6	5,346.6	21,854.5	2,032.3	9.3	-
1952	27,115.1	5,206.0	23,254.6	2,367.1	10.1	-
1953	30,121.8	5,753.2	27,043.0	3,134.0	11.6	-
1954	34,355.3	6,939.8	29,766.9	2,966.4	9.9	-
1955	36,268.0	7,362.4	28,796.8	3,505.5	12.1	-
1956	39,027.3	7,220.1	30,796.2	3,805.0	12.3	-
1957	41,001.0	7,626.2	33,522.6	4,039.1	12.0	-
1958	43,903.4	8,297.7	37,377.8	4,413.6	11.8	-
1959	48,070.1	8,556.5	40,892.5	5,256.4	12.8	-
1960	52,364.9	9,059.1	46,414.1	5,801.4	12.5	-
1961	57,067.3	9,815.6	51,695.2	6,512.5	12.6	-
1962	62,776.7	10,797.6	57,309.6	7,022.2	12.2	-
Total	680,608.6	128,908.8	578,216.0	67,972.8	11.7	- 60,936.0

^aIn constant 1960 prices.

Source: Solis, Leopoldo, "Hacia un Analisis General a Largo Plazo del Desarrollo Economico de Mexico," Demografia y Economia, Vol. 1, No. 1 (1967), p. 60.

price ratio fluctuated between 0.61 and 0.79 up to 1962 (See Table 67).

During World War II internal demand was concentrated on agricultural products due to the restrictions of the War. After World War II and during the Korean conflict, the rise of external demand for Mexican products, together with the devaluations of the Mexican peso in 1949 and 1954, helped to increase the index of prices of the agricultural products. The parity index was only 0.63 in 1962, indicating that in relation to 1951 the prices paid by the farmers increased substantially more than those received. The production of agricultural products increased substantially during this period while external demand was falling.

Another source indicates that the prices of agricultural products increased at a slightly higher rate than did industrial prices during the 1940's, at a lower rate in 1950-55 but at higher rates in 1955-65 (Table 82). The agrarian reform program increased the home consumption of agricultural products on the farms, and decreased the share available for the market, and, in general, for the urban sector. In the first half of the 1950's, when exports of livestock products were almost nil, industrial prices increased more rapidly than agricultural prices. In the 1955-65 period, agricultural prices tended to increase more rapidly than industrial prices. The greater increase in agricultural prices was undoubtedly affected by the fact

Table 82. Average Annual Rates of Change in Agricultural and Industrial Prices, Mexico, 1940 to 1965

Period	Agricultural	Industrial
1940-45	.156	.155
1945-50	.091	.088
1950-55	.048	.078
1955-60	.053	.044
1960-65	.045	.025

Source: Solis M., Leopoldo, "Inflacion, Estabilidad y Desarrollo: el Caso de Mexico," El Trimestre Economico. Vol. 35, No. 3 (July-Sept. 1968), pp. 483-516.

that livestock production failed to increase as rapidly as domestic demand and the fact that livestock exports increased also as shown earlier.

In conclusion, since 1940 the change in the level of prices was favorable to the agricultural sector, with the exception of the 1950-1955 period, but this was weighted by the favorable livestock prices. But whether agriculture has been a net supplier to or a net receiver of capital from the other sectors as a result of changes in the terms of trade is not entirely clear. While it appears that agriculture has been a net receiver from the government, it has been a supplier to the other sectors by way of transfers of the banking system, and the price system in most of the period under analysis has been favorable to the agricultural sector--much more in relation to livestock than to crops.

Transfer of Labor from Farms to Non-farm Sectors

Generally, it has been observed that the population growth rate in the farm sector exceeded the growth rate in the non-farm sectors. Also, the demand for non-farm goods and services was more elastic, with respect to price and income, in the non-farm sectors. Consequently, there was a transfer of labor from the farm sector to non-farm sectors in order to support the more rapid expansion of the non-farm sectors. In Mexico, in 1930, before the intensive land

redistribution period, the economically active population in agriculture was 70 percent of the total. This proportion declined continually to 65.3 percent in 1940, 58.3 percent in 1950 and 54.0 percent in 1960 [Population Censuses]. This transfer of labor from the farm to the non-farm sectors, while farm output per capita continued to increase, is evidence of technological change in the farm sector.

In the first stages of development, despite the fact that the percentage of the economically active population in the agricultural sector decreased with respect to the non-agricultural sector, there was an increase in absolute numbers in the economically active population in agriculture. The economically active population in Mexico in 1940 was 5,858,000 persons, 8,345,000 in 1950, and 11,253,000 in 1960; of which 3,831,000 in 1940, 4,867,000 in 1950 and 6,085,000 in 1960 were in agriculture.

In an estimate of the gross labor transfers from the agricultural to the non-agricultural sectors [Eckstein, 1969, pp. 146-150] assuming that both the agricultural and non-agricultural families were composed of members of the same ages and that both had grown at the same rate as the total economically active population⁵ (which underestimates the farm population), it was calculated that the economically active population in agriculture would have been 5,457,000 in

⁵3.6 percent in 1940-1950; 3.0 percent in 1950-1960.

1950 and 6,563,000 in 1960. These figures compared with those observed in the population censuses indicate a net transfer to the non-agricultural sector from agriculture of about 600,000 persons in the 1940's decade and 480,000 persons in the 1950-1960 period.⁶ Thus there is no reason to believe that the lack of labor transfer placed any restraints on growth in the non-farm sectors.

Farm Sector as an Expanding Market for
Non-farm Produced Goods and Services

The development of agriculture provided increases in the demand of farmers for inputs purchased from the non-farm sectors. In turn, these purchased inputs were a source of growth in farm incomes. Between 1940 and 1960 selected items increased as follows [Hertford, 1971, pp. 20, 32]:

	<u>Chemical</u> <u>Fertilizers</u>	<u>Insec-</u> <u>ticides</u>	<u>Composite</u> <u>Purchases</u>	<u>Machinery</u>
Index (1960=100):				
1940	4	1	18	13
1965	160	112	143	115
Compound annual growth, %	17.0	21.5	8.4	9.7

⁶Eckstein points out that this decrease has been due to limitations of absorption in the non-agricultural sector, as confirmed by the great number of unemployed and under-employed observed in Mexican cities and the fact that in the decade of the 1950's the rate of increase in productivity per man of the non-agricultural sector was greater than the rate of increase in the product of the sector, resulting in a lower rate of increase in the economically active population of the sector than in the previous decade [Eckstein, 1969, pp. 150-152].

The farm market for cloth, shoes, housing, electricity, medical services, and other non-farm consumption goods and services have increased, also. However, estimates of the magnitude of the increases were not found. This market has been restricted due to the unbalanced distribution of income not only with respect to the non-agricultural sector but also within the agricultural sector.

Among families of low income the main item of expense is food. A survey made in 1963 reported that among the agricultural families with monthly income of 0-300 pesos, 63.7 percent of their income was spent on food and beverages, while in the agricultural families with more than 10,000 monthly pesos of income, only 34.8 percent was spent on food and beverages [Banco de Mexico, 1966, pp. 270-291]. Lack of purchasing power in a large share of the farm families may have been a demand-limiting factor in the growth of the non-farm sectors.

Summary of Contributions to GNP

A rough estimate of the contribution to the agricultural GNP originating from general improvements in agricultural productivity is given in Table 83. The results indicate that most of the improvements in productivity have occurred since 1940.

An idea of the approximate contribution to GNP due to

Table 83. Approximate Contribution to GNP of Improvements in the Agricultural Sector, Mexico, Selected Years, 1910-1964^a

Year	Estimated Agricultural Labor Force (1)	Estimated Agricultural GNP (2)	Real Agricultural GNP (3)	Contribution to GNP Due to Improvements in Agriculture (3)-(2)
	--1,000 workers--	-----billion pesos at 1950 prices-----		
1910	3,596	4.6	4.6	-
1921	3,405	4.4	4.6	0.2
1930	3,617	4.6	3.9	-0.7
1940	4,087	5.2	5.4	0.2
1950	5,584	7.1	9.2	2.1
1960	7,649	9.8	14.0	4.2
1964	8,921	11.4	16.5	5.1

^aThis is a crude estimate based on the following assumptions:

- (1) that in 1921 and the following years the agricultural labor force constituted the same percentage of the total labor force as in 1910 (67.5 percent).
- (2) that farm workers had the same productivity-GNP per worker- in 1921 and the following years as in 1910 (1,279 pesos at 1950 prices per farm worker).

Source: Nacional Financiera, S.A. La Economía Mexicana en Cifras (Mexico, D.F.: Nacional Financiera, S.A., 1965).

changes in the agricultural sector (not only in productivity but also in transfer of population to the non-farm sector) can be estimated by the method used by Tweeten and Tyner [Tweeten and Tyner, 1964, pp. 1077-1078]. The results of this approach indicate that the changes in agriculture since 1910 increased GNP by 20.1 billion pesos, at 1950 prices, in 1964 (Table 84).

Table 84. Approximate Contribution to GNP of Changes in the Agricultural Sector, Mexico, Selected Years, 1910-1964^a

Year	Estimated GNP (1)	Real GNP (2)	Agricultural Contribution to GNP due to Changes in Agriculture (2)-(1)
-----billion pesos at 1950 prices-----			
1910	14.7	14.7	0
1921	16.4	15.9	-0.5
1930	17.0	16.9	-0.1
1940	21.0	22.6	1.6
1950	34.1	41.1	7.0
1960	60.2	74.3	14.1
1964	74.5	94.6	20.1

^aThis estimate is based on the following assumptions:

- (1) that in 1921 and the following years the agricultural labor force constituted the same percentage of the total labor force as in 1910 (67.5 percent).
- (2) the economy is divided only in farm and non-farm sectors; actual real productivities in each year were used to compute the estimated GNP.

Source: Nacional Financiera, S.A. La Economía Mexicana en Cifras (Mexico, D.F.: Nacional Financiera, S.A., 1965).

CHAPTER VII
PRIVATE OWNERSHIP VERSUS EJIDOS

Origin, Organization, and Location of Ejidos

The agrarian reform program of the Mexican Revolution divided agriculture into two types of ownership: private property and ejidos. The ejido was a system of ownership directly established by the Revolution. The ownership of the land under the ejidal system belongs to the community--the village, which acts as a legal entity under the agrarian law, and also acts as the intermediary that gives the right of usufruct or possession of the lands to the ejidatarios. The legal limitations associated with the ejidal lands are that they cannot be sold, rented or mortgaged. However, in practice, individual ejidos are sometimes illegally rented. The main reason for renting is the lack of needed inputs, especially credit, needed to work the ejidos efficiently. Renting the ejidal parcel implies a reallocation of land toward a more efficient use.¹

The ejidos can be cultivated individually through

¹Also in several cases, the ejidal plots are sold, with title remaining unchanged, since legally they cannot be sold but the usufructuary rights are in practice transferred [Belshaw, 1967, p. 22].

division of the ejidal lands into ejidal parcels by the village or they can be worked collectively with the benefits from production divided among the ejidatarios. The ejidos, whether individual or collective, are organized in the following way. The highest authority is held by the ejidatarios' assembly. To operate the ejidos, members of the assembly elect, through delegation of authority, a three-member "Comisariado Ejidal" (Ejidal Executive Committee), that holds the administrative duties, and a three-member "Comite de Vigilancia" (Vigilance Committee), that keeps track of the activities of the "Comisariado". The membership on these committees is for three years. The main functions of the Comisariado's members (chairman, secretary and treasurer) are to represent the ejido for all purposes and the administration of the collective means of the ejido. In carrying out these functions the Comisariado works through the representatives of the Secretariat of Agriculture, the Agrarian Department and the BNCE (National Bank of Ejidal Credit), which exercises supervision rights over the ejido's activities.²

In the case of ejidos worked individually, only the croplands are divided into ejidal parcels. The pastures

²In many instances the Comisarios do not act according to the best interests of the ejido, nor do they keep an impartial attitude in the problems that arise among ejidatarios. An indication of this condition is the fact that almost 10,000 comisarios were released from their assignments in 1959-60 [Hinojosa, 1961, p. 221].

and forest lands are used collectively. Each ejidatario has a right to those lands for purposes of obtaining wood and grazing cattle. On the individual ejidos, the emphasis is on crop production, and the real unit of production is each ejidal plot rather than the ejido as a whole.

On the collective ejidos, land is tilled and used in common. They are organized through the "Comisariado Ejidal" and "Comite de Vigilancia," but also the general assembly of ejidatarios elects a work-chief, who meets weekly with the "Comisariado Ejidal" and the representatives of the BNCE to plan work for each week. The remuneration of the ejidatarios for their work is made in different ways--by a salary that depends on the skills, or by piece rates if these can be established. The remainder of the income, after the crops have been sold--generally through the BNCE--and loans and other obligations have been paid and contributions have been made to the social fund of the ejido, is distributed to the ejidatarios in accordance with the number of hours worked during the period. The advantages of the collective ejidos over the individual ejidos are associated with larger scale of production that permits division of labor and specialization. But among its disadvantages are the lack of discipline and the jealousy that emerged among the members with respect to working matters. Also problems arose similar to those of the local societies of ejidal credit when the cooperative societies were imposed upon the members without a rigorous

selection of membership.

Only a small number of ejidos are worked collectively. The Agricultural Census reported 7,623 ejidos in 1960³, of which only 431 or 6 percent were collectively organized. Most of the collective ejidos, 281, specialized in cattle raising, and 150 were engaged in crop production.⁴ The majority of the collective ejidos are located in the Comarca Lagunera.⁵

The reform laws gave land to the ejidos under three provisions: restitution of previously held land, dotation of land to a community without land, and expansion or giving more land to communities already holding some land. Very few ejidos obtained lands under the restitution provisions and dotation was the provision most frequently employed. Up to 1965, 27,775 ejidos had been established and included over two million ejidatarios and 47 million hectares (Table 85). Initially, the redistribution of land to the ejidos proceeded slowly--by the end of 1926 only 2.6 percent of the area of the Republic had been distributed [Tannenbaum, 1929, p. 326]. The delay was not only due to slow action

³This number of ejidos was reported in Table 45 of the Census which had a footnote specifying that the numbers in this Table must be considered with reservation and are of questionable validity. Table 44 of the Census reported 18,301 ejidos in existence in 1960.

⁴Another source estimated that only 5 percent of the ejidos were organized collectively and about 10 percent of the ejidatarios received land grants [Foreman, 1950, p. 74].

⁵In a study of the Laguna area, Senior concluded among other things that the major factor in the success or failure

Table 85. Distribution of Ejidos, by Basis of Land Acquisition and by State and Region, Mexico, 1915 to August 31, 1965

State	Number of Ejidos				Number of Persons (1,000)	Ha. (mil.)
	Total	Resti- tution	Dotation	Exten- sion		
<u>North</u>	<u>7,547</u>	<u>63</u>	<u>5,091</u>	<u>2,393</u>	<u>457</u>	<u>20.4</u>
Coahuila	901	2	670	229	69	2.4
Chihuahua	902	24	620	258	65	2.4
Durango	1,257	13	718	526	75	3.7
Nuevo Leon	775	3	585	187	33	1.4
San Luis Potosi	1,497	18	953	526	92	3.2
Tamaulipas	1,167	1	879	287	44	1.4
Zacatecas	1,048	2	666	380	79	2.9
<u>North Pacific</u>	<u>1,841</u>	<u>48</u>	<u>1,338</u>	<u>455</u>	<u>139</u>	<u>4.6</u>
Baja Calif.	89	-	84	5	7	0.4
Baja Calif. (Fed. Ter.)	40	1	38	1	4	0.1
Nayarit	524	9	316	199	42	1.0
Sinaloa	787	22	602	163	58	1.7
Sonora	401	16	298	87	28	1.4
<u>South Pacific</u>	<u>3,517</u>	<u>17</u>	<u>2,783</u>	<u>717</u>	<u>263</u>	<u>5.5</u>
Colima	169	1	107	61	10	0.2
Chiapas	1,377	4	1,060	313	98	1.8
Guerrero	1,252	10	978	264	83	2.3
Oaxaca	719	2	638	79	72	1.2
<u>Center</u>	<u>10,548</u>	<u>70</u>	<u>7,376</u>	<u>3,102</u>	<u>863</u>	<u>8.4</u>
Aguascalientes	366	-	224	142	15	0.2
D.F.	104	7	69	28	18	-
Guanajuato	1,643	4	1,243	396	97	1.1
Hidalgo	1,169	4	755	410	71	0.7
Jalisco	1,622	5	1,140	477	137	1.7
Mexico	1,400	12	988	400	163	0.8
Michoacan	1,758	10	1,328	420	140	1.8
Morelos	320	6	193	121	30	0.3
Puebla	1,452	19	945	488	124	1.1
Queretaro	465	-	310	155	31	0.5
Tlaxcala	249	3	181	65	37	0.2

Table 85. Continued.

State	Number of Ejidos				Number of Persons (1,000)	Ha. (mil.)
	Total	Resti- tution	Dotation	Exten- sion		
<u>Gulf</u>	<u>4,322</u>	<u>33</u>	<u>3,485</u>	<u>805</u>	<u>314</u>	<u>7.8</u>
Campeche	296	2	166	128	26	2.0
Quintana Roo	132	-	116	16	8	1.7
Tabasco	454	3	397	54	37	0.6
Veracruz	2,771	26	2,347	399	168	1.9
Yucatan	<u>669</u>	<u>2</u>	<u>459</u>	<u>208</u>	<u>75</u>	<u>1.6</u>
Total	27,775	231	20,073	7,472	2,036	46.7

Source: Depto. Asuntos Agrarios; taken from Aleman Aleman, Eloisa, Investigacion Socioeconomica Directa de los Ejidos de San Luis Potosi (Mexico, D.F.: Instituto Mexicano de Investigaciones Economicas, 1966), p. 27.

on the part of the government, it was also due to the fact that the peasants were afraid to accept land.⁶ If they were given land, in most cases they were not provided with the needed means to acquire other inputs. The peasant who received land under the agrarian program in many communities was isolated due to being "agrarista" (agrarian), and even the priest refused to bless him. The Catholic Church was opposed to the revolution, to the agrarian reform, and to the ejidos.⁷

This attitude of the Mexican peasants, the prevalence at that time of the Diaz' "científicos" ("scientists") ideas about the vast richness of the Mexican soil, and the need for immigration to inhabit the unpopulated areas of the country associated with the decrease in the Mexican population during the peak of the Revolutionary War were the main reasons why an increase in rural population was not foreseen.

of the collective ejidos was the presence of favorable climatic factors. This was the main factor despite the lack of discipline he noticed among the ejidatarios [Senior, 1958, p.114].

⁶Indications of this condition are reported in Zacatecas Económico and Problemas de la Cuenca del Tepalcatepec. For examples, the ejido Aldama was dotated in 1929 for 500 ejidatarios, but only 83 accepted; the ejido Ojocaliente was dotated in 1923 for 500 ejidatarios but only 40 accepted [De la Pena, 1964, pp. 322-23].

⁷In a sociological study of one Mexican village (Huecorio), located between Mexico City and Guadalajara, it was reported that in the early years of the Revolution the priest of the village led an attack on the ejido, which divided the village and created factionalism [Belshaw, 1967, p. 17].

Also, it was for these reasons that the relationship between population and available farm land was not really appreciated by the early revolutionary Mexican governments.⁸

These circumstances led to the development of ejidal minifundism. Although the average land per ejidatario, computed from Table 85, was approximately 24 hectares, only 0.8 was irrigated land and 4.9 hectares were "temporal" (seasonal) land, or a total of only 5.7 hectares suitable for crop cultivation. In many cases, particularly in the 1930's and the early distribution years, the averages were even lower. Belshaw reported that in Huecorio, each of 134 persons, who were initially entitled to receive an ejidal plot, received three plots totalling 1.13 hectares [Belshaw, 1967, p. 13]. In many cases, the ejidos suffered not only from minifundism, but, due to the agrarian law procedures, they were subjected to fragmentation also.

In 1934, it was recognized that the land available for redistribution was not enough for all peasants, who had a right to receive land, to receive the minimum area of land established by the law. Consequently, Article 85 of the

⁸Another fact that was not foreseen is that initially the agricultural workers, about half of the rural population at that time, were excluded from the right to receive lands in the ejidos. In the 1930's, during the Cardenas administration, their right to benefit from the land redistribution programs of the revolution was recognized [Tannenbaum, 1929, p. 321].

Agrarian Code of 1934 stated that, "In the event that there are not enough crop or cultivatable lands which can be affected to integrally satisfy the needs of all the peasants with rights, the units of dotation will be given according to the following preferential order...[in case there is not enough land] the rights of the individuals not benefited will be left "a salvo" [a right that would continue until land is available]." This procedure was started in 1934 and since then, when an ejido is divided into plots, those persons who do not get a parcel are given a certificate of future ejidal rights. Over one million persons have received these certificates, but they have no meaning since additional land is not likely to become available in the foreseeable future. These certificates raise hopes on the part of individuals but it is impossible for the government to fulfill them.

In the remainder of this chapter, the differences in incomes are presented and explained on the basis of available data.

Income in Relation to People and Land

In 1950, income per ejidatario was nearly two-thirds of the national average for all farms, while private farms of more than five hectares averaged nearly $4 \frac{1}{2}$ times the national average and those of five hectares and less averaged a little less than one-fourth the national average (Table 86). While

Table 86. Income Per Ejidatario and Per Landowner on Privately Owned Farms, by Region and State, Mexico, 1950

Region and State	Ejidos		Private		Private		Average
	Pesos	Index ^a	>5 Hectares	Index ^a	>5 Hectares	Index ^a	
			Pesos		Pesos		
<u>Mexico</u>	1,005	-	6,877	-	352	-	1,538
<u>North</u>							
Coahuila	2,457	67	10,024	271	754	20	3,693
Chihuahua	1,396	40	9,059	263	1,690	49	3,450
Durango	1,177	48	8,265	334	744	30	2,474
Nuevo Leon	753	29	6,112	235	787	30	2,596
San Luis Potosi	583	50	6,484	554	298	25	1,170
Tamaulipas	2,945	55	9,828	185	707	13	5,317
Zacatecas	687	66	1,977	191	473	46	1,034
<u>North Pacific</u>							
Baja Calif.	15,881	78	27,891	138	4,899	24	20,282
Baja Calif. (Fed. Ter.)	745	47	1,202	76	3,255	205	1,584
Nayarit	2,269	79	13,517	468	379	13	2,889
Sinaloa	2,265	49	13,850	299	827	18	4,637
Sonora	2,505	46	14,560	270	973	18	5,393
<u>South Pacific</u>							
Colima	1,219	23	20,864	400	1,509	29	5,222
Chiapas	774	44	6,462	366	765	43	1,765
Guerrero	698	63	5,586	506	487	44	1,103
Oaxaca	618	48	20,337	1,589	361	28	1,280
<u>Center</u>							
Aguascalientes	614	58	2,878	274	1,024	98	1,050
D.F.	89	36	14,522	5,809	182	73	250
Guanajuato	614	33	7,247	393	443	24	1,845
Hidalgo	346	49	6,257	895	234	33	699
Jalisco	840	60	3,320	237	254	18	1,403
Mexico	173	58	4,260	1,434	195	66	297
Michoacan	1,104	80	5,298	386	371	27	1,372
Morelos	1,738	105	8,920	541	540	33	1,649
Puebla	432	97	4,084	914	215	48	447
Queretaro	258	43	3,784	630	159	26	601
Tlaxcala	447	73	13,054	2,126	178	29	614

Table 86. Continued.

Region and State	Ejidos		Private				Average
	Pesos	Index ^a	> 5 Hectares		< 5 Hectares		
			Pesos	Index ^a	Pesos	Index ^a	
Gulf							
Campeche	545	24	16,355	718	1,186	52	2,277
Quintana Roo	2,850	40	43,064	609	2,857	40	7,077
Tabasco	1,135	42	5,329	197	1,121	41	2,702
Veracruz	2,112	84	5,660	226	839	33	2,507
Yucatan	448	58	4,310	555	270	35	776

^aAverage within states = 100.

Source: Yanez-Perez, Luis, "Tenencia y Extension de la Propiedad Agricola en Mexico," Investigacion Economica, Vol. 17, No. 1 (1957), p. 144.

the average income varied widely among states, the rankings of the three groups of farms were rather consistent, with a number of exceptions in which the income on farms of five hectares and less exceeded those of ejidatarios. The value of gross output per farm worker in 1960 showed a similar ranking among these three types of land holdings (Table 87). Ejidos, private farms with five hectares or less, and private farms with more than five hectares, respectively, accounted for 44.3 percent, 28.0 percent and 27.7 percent of the workers.

The North and North Pacific regions produced many of the revolutionary leaders (the State of Sonora). Consequently, these two regions received substantial amounts of public expenditures, especially for rural credit and irrigation (the annual rainfall is less than 20 inches per year). These two regions include the Sonora Desert and the western parts of the Northern region. These northern parts of Mexico are in close proximity to the United States and produce export commodities. Consequently, there is a good system of roads and other transportation facilities. Both the North and the North Pacific experienced widespread land reform in the 1930's when President Cardenas confiscated, under the agrarian reform programs, the lands in the plantation type of economy prevailing there. The Center and the Gulf regions are the places where the traditions of Mexico have been kept alive. In the Central Plateau, there is high population density and

Table 87. Value of Total Farm Production and Production per Worker, by Type of Land Holding, Mexico, 1960

Type of Holding	Number of Workers			Gross Farm Output ^a	Gross Output Per Farm Worker	
	Family	Hired	Total		Pesos	Index

^aIncludes crops, livestock, and forestry, excluding livestock in towns.

^bHired workers include aparceros (partners) under the direction of landowner, journeymen and day laborers, and employees and workers in other categories.

^cA gross estimate of journeymen and day laborers based on the reported expenses.

Source: IV Censo Agrícola Ganadero y Ejidal, 1960.

intensive cultivation in which the traditional techniques are used; also there are heavy rains and extremely high humidity. The South Pacific is the other region and it is mountainous and without extensive valleys. It has received little investment in irrigation. In 1960, 47 percent of the area covered by the Census was located in the North (Table 88). The North and the North Pacific, according to the 1960 Census, contained 49 percent and 15 percent, respectively, of the private lands while only 42 percent of the ejidal lands were located in the North, and 10 percent in the North Pacific. The Center region contained 20 percent of the ejidal lands and only 9 percent of the private lands. In the North and North Pacific regions ejidos held 23.2 percent and 19.7 percent, respectively, of the agricultural land in 1960, compared with 44.0 percent in the Center region (Table 89). Thus the ejidos apparently have a disproportionate share of the less productive lands.

The 1960 Census included 169 million hectares of land; the previous censuses covered less---131 million in 1930, only 128 million in 1940, and 145 million in 1945. Due to these differences in area covered, the figures from the different censuses are not directly comparable as a large part of these differences is accounted for by differences in the completeness of the coverage rather than by actual differences in the area in farms.

Table 88. Distribution of Land by Type of Ownership and by Region, Mexico, 1940, 1950 and 1960

Region	Total Area			Ejidal			Private		
	1940	1950	1960	1940	1950	1960	1940	1950	1960
	percent								
North	52	48	47	45	42	42	54	51	49
Gulf	14	14	15	14	15	16	14	13	14
North Pacific	11	13	13	10	11	10	11	14	15
South Pacific	10	12	13	8	10	12	11	12	13
Center	13	13	12	23	22	20	10	10	9
Total	100	100	100	100	100	100	100	100	100

Source: Calculated from Table 175.

Table 89. Percentage Distribution of Land by Region and Type of Land Holding, Mexico, Census Years 1930 to 1960

Region and Type of Holding	Total Land				Crop Land			
	1930	1940	1950	1960	1930	1940	1950	1960
	-----percent-----							
<u>Mexico</u>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private								
>5 ha.	93.0	76.5	72.4	72.9	80.6	45.4	49.5	51.3
≤5 ha.	0.7	1.0	0.9	0.8	6.1	7.2	6.4	5.3
Ejidos	6.3	22.5	26.7	26.3	13.3	47.4	44.1	43.4
<u>North</u>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private								
>5 ha.	94.7	80.4	76.5	76.7	80.8	48.6	51.7	56.3
≤5 ha.	0.1	0.2	0.2	0.1	3.1	4.1	3.2	1.8
Ejidos	5.2	19.4	23.3	23.2	16.1	47.3	45.1	41.9
<u>Gulf</u>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private								
>5 ha.	89.9	76.6	70.1	70.0	83.1	43.6	52.8	53.7
≤5 ha.	0.6	0.7	0.7	0.7	3.3	4.1	3.6	3.7
Ejidos	9.5	22.7	29.2	29.3	13.6	52.3	43.6	42.6
<u>North Pacific</u>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private								
>5 ha.	96.3	79.5	78.0	80.2	88.5	44.6	60.1	54.8
≤5 ha.	0.3	0.3	0.2	0.1	3.8	3.4	1.4	1.2
Ejidos	3.4	20.2	21.8	19.7	7.7	52.0	38.5	44.0
<u>South Pacific</u>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private								
>5 ha.	94.2	80.8	74.9	73.5	86.8	57.0	59.5	57.5
≤5 ha.	1.3	1.5	1.6	1.6	6.7	9.0	7.8	7.2
Ejidos	4.5	17.7	23.5	24.9	6.5	34.0	32.7	35.3
<u>Center</u>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Private								
>5 ha.	85.8	56.3	51.4	52.5	75.0	39.7	36.6	39.5
≤5 ha.	2.6	3.8	4.0	3.5	9.4	10.8	11.3	9.9
Ejidos	11.6	39.9	44.6	44.0	15.6	49.5	52.1	50.6

Source: Calculated from Tables 175 and 176.

Privately owned farms have consistently accounted for a higher proportion of output than their share of cropland (Table 90). The value of output per hectare of cropland has been highest on the units of five hectares or less. However, the percentage of output from the small farms and ejidos is much larger than their share of total land. Value of output per hectare of cropland, in 1960, was highest in the North Pacific region and lowest in the South Pacific (Table 91). Value of crop production per hectare harvested has tended to be highest on the larger privately owned farms (Table 92).

As expected, the small farms sold a much smaller share of output than did the larger units (Table 93). Between 1940 and 1960, value of crop production per hectare of tilled land increased most on large private farms (85 percent) and least on the small farms (45 percent) (Table 94).

Differences in value of output may be related to the composition of output and to differences in crop yields. These two features are examined next, before an analysis of differences in inputs.

Composition of Output

In general, the lands on the privately owned farms of five hectares or less are used almost entirely for crop production in comparison with an average of 9.9 percent on the larger privately owned farms and 23.2 percent on the

Table 90. Distribution of Land and Value of Production by Type of Land Holding, Mexico, Census Years 1930 to 1960

Year and Type of Holding	Total Land	Cropland	Value of Production ^a	Value of Production per Hectare	
				Total Land	Cropland
	percent of total			pesos	
1930	100.0	100.0	100.0	4	33
Private					
>5 ha.	93.0	80.6	89.3	4	36
≤5 ha.	0.7	6.1			
Ejidos	6.3	13.3	10.7	6	26
1940	100.0	100.0	100.0	8	72
Private					
>5 ha.	76.5	45.4	36.0	4	57
≤5 ha.	1.0	7.2	20.4	189	204
Ejidos	22.5	47.4	43.6	16	67
1950	100.0	100.0	100.0	46	333
Private					
>5 ha.	72.4	49.5	52.2	33	351
≤5 ha.	0.9	6.4	8.9	431	459
Ejidos	26.7	44.1	38.9	66	294
1960	100.0	100.0	100.0	120	850
Private					
>5 ha.	72.9	51.3	57.8	95	958
≤5 ha.	0.8	5.3	6.5	986	1,040
Ejidos	26.3	43.4	35.7	162	699

^aExcludes cattle in towns as reported in 1950 and 1960.

Source: Calculated from data in Tables 175 and 176.

Table 91. Distribution of Land and Value of Production by Regions, Mexico, 1960

Region and Type of Holding	Total Land	Cropland	Value of Production ^a	Value of Production per ha.	
				Total Land	Cropland
-----percent of total-----					
-----pesos-----					
<u>North</u>	100.0	100.0	100.0	72	970
Private > 5 ha.	76.7	56.3	70.6	66	1,215
Private ≤ 5 ha.	0.1	1.8	2.5	1,295	1,394
Ejidos	23.2	41.9	26.9	83	623
<u>Gulf</u>	100.0	100.0	100.0	128	756
Private > 5 ha.	70.0	53.7	49.2	90	692
Private ≤ 5 ha.	0.7	3.7	4.8	927	975
Ejidos	29.3	42.6	46.0	201	818
<u>North Pacific</u>	100.0	100.0	100.0	143	1,296
Private > 5 ha.	80.2	54.8	64.1	114	1,516
Private ≤ 5 ha.	0.1	1.2	1.8	1,839	1,966
Ejidos	19.7	44.0	34.1	246	1,005
<u>South Pacific</u>	100.0	100.0	100.0	128	593
Private > 5 ha.	73.5	57.5	55.9	97	576
Private ≤ 5 ha.	1.6	7.2	9.9	816	821
Ejidos	24.9	35.3	34.2	176	574
<u>Center</u>	100.0	100.0	100.0	266	811
Private > 5 ha.	52.5	39.5	46.4	236	956
Private ≤ 5 ha.	3.5	9.9	12.9	991	1,052
Ejidos	44.0	50.6	40.7	246	652

^aExcludes cattle in towns.

Source: Calculated from data in Tables 175 and 176.

Table 92. Crops^a: Area Harvested and Value of Production, by Type of Land Holding, Mexico, Census Years 1930 to 1960

Year and Type of Holding	Area Harvested		Value of Production		Value of Production per Hectare, Pesos
	1,000 Hectares	Percent	Mil. Current Pesos	Percent	
<u>1930</u>					
Total	6,035	100.0	457	100.0	76
Private	5,230	86.6	407	89.1	78
Ejidos	805	13.4	50	10.9	64
<u>1940</u>					
Total	7,314	100.0	807	100.0	110
Private					
>5 ha.	3,045	41.6	324	40.3	106
≤5 ha.	749	10.2	75	9.2	100
Ejidos	3,520	48.2	408	50.5	116
<u>1950</u>					
Total	9,433	100.0	5,140	100.0	545
Private					
>5 ha.	4,190	44.4	2,776	54.1	662
≤5 ha.	911	9.6	451	8.7	495
Ejidos	4,332	46.0	1,913	37.2	442
<u>1960</u>					
Total	12,088	100.0	14,396	100.0	1,191
Private					
>5 ha.	5,756	49.2	7,702	53.6	1,338
≤5 ha.	861	7.1	823	5.7	956
Ejidos	5,471	43.7	5,870	40.7	1,073

^aIncluding fruit, plantations, agaves for fiber and for beverages and products of uncultivated but productive lands.

Source: Censo Agrícola, Ganadero y Ejidal. Several years.

Table 93. Value of Production and Marketing of Farm Products,
by Type of Land Holding, Mexico, 1960^a

Item	Private Farms		Ejidos	Total
	>5 Hectares	≤5 Hectares		
	-----million pesos-----			
Crop and Animal Production	10,832	1,309	7,038	19,179
Sold	8,722	602	4,778	14,102
	-----percent-----			
Marketings as Percent of Total	80.5	45.9	67.8	73.5

^aExcludes livestock in towns and forestry.

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 94. Crop Value per Hectare of Tilled Land, by Type of Land Holding, Mexico, at 1960 Prices, for 1940 and 1960

Type of Holding	Pesos per Hectare		1960 as Percent of 1940
	1940	1960	
Private			
>5 Ha.	340	630	185
≤5 Ha.	448	649	145
Ejidos	366	559	152
Average	360	604	168

Source: Censo Agrícola, Ganadero y Ejidal (II - 1940 and IV - 1960).

ejidos (Table 95). In comparison with the larger privately owned farms, the ejidos use approximately an equal percentage of the lands for pasture and a much smaller percentage for forests. Among the regions, the highest percentage used for crops was in the Center region. Eighteen percent of the privately owned farms of more than five hectares were classed as livestock farms in 1960, compared with 4 percent of the ejidos (Appendix Table 177).

The 1960 Census reported the total value of livestock to be 20 billion pesos--the ejidos held 25.3 percent, towns held 21.1 percent, small private farms owned 6.0 percent, and the larger private farms owned the remaining 47.6 percent (Table 96).

The low percentage of the total livestock population held by the ejidos, according to Mexican economists, is the result of a determined effort to deny the ejidos of the livestock character which is appropriate to them [Duran, 1947, p. 46]. Articles 81 and 82 of the Agrarian Code state that the ejidos will be operated for livestock production only if lands not suited to crop production are available and "...when the peasants have at least 50 percent of the livestock needed to cover the area, or when the State is in the position to help them to satisfy that condition..." The State has provided little assistance to date, as livestock credit for the ejidos is almost non-existent.

Table 95. Percentage Distribution of Land Use by Region and Type of Land Holding, Mexico, 1960

Region and Type of Holding	Crops	Pastures	Forests	percent		Total
				Uncultivated but Productive	Agriculturally Unproductive	
Mexico	14.1	46.8	25.8	6.6	6.7	100.0
Private >5 ha.	9.9	48.2	28.9	5.9	7.1	100.0
Private ≤5 ha.	95.6	2.7	0.5	0.1	1.1	100.0
Ejidos	23.2	44.1	18.0	8.9	5.8	100.0
North	7.4	57.5	21.2	7.8	6.1	100.0
Private >5 ha.	5.4	57.8	23.6	6.9	6.3	100.0
Private ≤5 ha.	92.9	4.5	-	0.8	1.8	100.0
Ejidos	13.4	56.8	13.6	10.7	5.5	100.0
Gulf	16.9	18.2	45.0	11.9	8.0	100.0
Private >5 ha.	13.0	18.8	47.9	11.7	8.6	100.0
Private ≤5 ha.	94.7	2.9	0.6	-	1.8	100.0
Ejidos	24.6	16.9	39.0	12.6	6.9	100.0
North Pacific	11.0	62.5	18.4	2.4	5.7	100.0
Private >5 ha.	7.5	66.9	19.6	1.4	4.6	100.0
Private ≤5 ha.	93.6	3.2	-	-	-	96.8
Ejidos	24.5	44.9	13.8	6.4	10.4	100.0
South Pacific	21.6	28.8	37.5	4.2	7.9	100.0
Private >5 ha.	16.9	25.8	44.9	3.1	9.3	100.0
Private ≤5 ha.	99.4	0.6	-	-	-	100.0
Ejidos	30.6	39.5	17.9	7.6	4.4	100.0
Center	32.8	41.2	16.2	2.7	7.1	100.0
Private >5 ha.	24.7	42.6	20.8	1.9	10.0	100.0
Private ≤5 ha.	94.2	3.3	0.7	0.3	1.5	100.0
Ejidos	37.9	42.2	12.0	3.9	4.0	100.0

Source: Calculated from data in Table 178.

Table 96. Livestock Values, by Type of Land Holding, Mexico, 1960

Type of Holding	Value	Percentage	Percentage (Excluding Towns)
	(mil. pesos)		
<u>Mexico</u>	20,200	100.0	100.0
Private			
>5 Hectares	9,629	47.6	60.4
≤5 Hectares	1,209	6.0	7.6
Ejidos	5,106	25.3	32.0
Towns	4,256	21.1	-

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Under these circumstances and influenced by the population pressure, the ejidatarios probably have used, for crop production purposes, areas that on account of their characteristics should have been used as pastures for the livestock.

In general, a higher percentage of the value of output on ejidos was from crops than was the case on larger farms (Tables 97 and 98). In summary, a very large part of the differences in value of output per unit of land, among types of land holding units and within regions, is attributed to the differences in composition of output, i.e., crops, livestock, and forestry. The value of crops per hectare, of course, is considerably higher than the value of livestock and forest products.

Within the category of crops, there are also wide differences in value of output per unit of cropland. The highest values of output per hectare of cropland were in the North Pacific and North regions in 1960 (see Table 91). The value of output per hectare of cropland is directly related to the percentage of cropland used for cotton and wheat production and inversely related to the share of land used for corn production (Tables 99 and 100). The ejidos and smaller privately owned farms produce more corn in relation to cotton and wheat than do the larger privately owned farms.

Table 97. Value of Crop, Forest, and Animal Production, by Type of Land Holding, Mexico, Census Years 1930 to 1960

Year and Type of Holding	Crops ^a	Forest	Animal	Total Agriculture	Percent from Crops
-----million pesos-----					
<u>1930</u>					
Mexico	457	21	b	478	95.6
Private	407	20	b	427	95.3
Ejidos	50	1	b	51	98.0
<u>1940</u>					
Mexico	809	17	250	1,075	75.3
Private					
>5 ha.	325	8	55	387	84.0
≤5 ha.	76	-	143	219	34.2
Ejidos	408	9	52	469	87.0
<u>1950</u>					
Mexico	5,142	130	2,320	7,592	67.7
Private					
>5 ha.	2,777	66	621	3,464	80.1
≤5 ha.	451	-	137	588	76.7
Ejidos	1,914	64	603	2,581	74.2
Towns	-	-	959	959	-
<u>1960</u>					
Mexico	14,396	1,055	6,002	21,452	67.1
Private					
>5 ha.	7,703	872	3,129	11,703	65.8
≤5 ha.	823	-	485	1,309	62.9
Ejidos	5,870	183	1,169	7,221	81.3
Towns	-	-	1,219	1,219	-

^aIncludes fruits, agaves for fiber and for beverage, and products from non-cultivated lands.

^bNot reported.

Source: Censo Agricola, Ganadero y Ejidal. Selected years.

Table 98. Value of Agricultural Production, by Type of Production and Type of Land Holding, Mexico, 1960

Type of Production	Privates ^a ha.		Private ^a ha.		Ejidos		Towns		Total	
	Mil. Pesos	% of Total	Mil. Pesos	% of Total	Mil. Pesos	% of Total	Mil. Pesos	% of Total	Mil. Pesos	% of Total
Crops	5,638	48.1	603	46.1	4,733	65.5	-	-	10,974	51.1
Fruits	1,658	14.2	190	14.5	716	9.9	-	-	2,564	12.0
Beverages, Agaves	222	1.9	28	2.1	70	1.0	-	-	321	1.5
Fiber, Agaves	115	1.0	2	0.2	301	4.2	-	-	418	1.9
Products from										
Uncultivated Land	69	0.6	a	-	50	0.7	-	-	119	0.6
Total Value of										
Crop Production	(7,703)	(65.8)	(823)	(62.9)	(5,870)	(81.3)	-	-	(14,396)	(67.1)
Forest	872	7.5	-	-	183	2.5	-	-	1,055	4.9
Animal	3,129	26.7	485	37.1	1,169	16.2	1,219	100.0	6,002	28.0
Total Agriculture	11,703	100.0	1,309	100.0	7,221	100.0	1,219	100.0	21,452	100.0
percent										
Share of Total	54.5	6.1	33.7	5.7	100.0					

^aNot reported.

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 99. Percentage Distribution of Area Among Principal Crops, by Region and Type of Land Holding, Mexico, 1960

Region and Type of Holding	Corn	Beans	Sugarcane	Wheat	Cotton	Coffee	Total
	percent of total						
<u>Mexico</u>	76.2	5.0	2.0	6.9	6.1	3.8	100.0
Private							
5 ha.	66.0	8.8	1.2	9.4	9.1	5.5	100.0
5 ha.	85.9	2.5	1.2	3.2	0.4	6.8	100.0
Ejidors	82.3	2.5	2.7	5.6	4.6	2.3	100.0
<u>North</u>	62.8	10.3	1.0	9.0	16.3	0.6	100.0
Private							
5 ha.	54.3	16.8	0.6	8.1	19.6	0.6	100.0
5 ha.	78.0	3.4	1.7	8.5	5.0	3.4	100.0
Ejidors	71.3	3.6	1.5	10.0	13.1	0.5	100.0
<u>Gulf</u>	84.3	3.5	5.7	-	-	6.5	100.0
Private							
5 ha.	75.7	7.9	4.3	-	-	12.1	100.0
5 ha.	61.0	3.9	5.2	-	-	29.9	100.0
Ejidors	88.1	2.0	6.3	-	-	3.6	100.0
<u>North Pacific</u>	45.3	4.6	2.3	26.9	19.9	1.0	100.0
Private							
5 ha.	26.6	4.1	2.1	41.6	23.9	1.7	100.0
5 ha.	53.3	6.7	-	33.3	6.7	-	100.0
Ejidors	58.9	5.1	2.4	16.1	17.1	0.4	100.0
<u>South Pacific</u>	83.0	2.6	1.0	0.5	0.2	12.7	100.0
Private							
5 ha.	75.1	4.1	0.5	0.6	0.4	19.3	100.0
5 ha.	86.0	2.5	1.1	2.9	-	7.5	100.0
Ejidors	88.6	1.5	1.4	-	0.1	8.4	100.0
<u>Center</u>	88.7	2.9	1.5	6.0	0.1	0.8	100.0
Private							
5 ha.	85.3	4.9	0.8	7.7	-	1.3	100.0
5 ha.	91.7	2.1	0.6	2.3	-	3.3	100.0
Ejidors	90.3	1.9	2.0	5.6	0.1	0.1	100.0

Source: Calculated from data in Table 179.

Table 100. Area Harvested, Main Crops by Type of Land Holding, Mexico, 1960

Crop	Total	Private		Ejidos
		>5 Hectares	≤5 Hectares	
-----1,000 hectares-----				
Corn	6,803	2,917	673	3,214
Beans	741	349	23	369
Wheat	846	506	25	315
Cotton	752	486	3	263
Sugarcane	302	148	9	144
Coffee	380	223	46	112
Other	2,264	1,127	82	1,055
Total	12,088	5,756	861	5,472
-----percent by crops-----				
Corn	56.4	50.7	78.2	58.8
Beans	6.1	6.1	2.7	6.7
Wheat	7.0	8.8	2.9	5.8
Cotton	6.2	8.4	0.3	4.8
Sugarcane	2.5	2.6	1.0	2.6
Coffee	3.2	3.9	5.3	2.0
Other	18.8	19.6	9.5	19.3
Total	100.0	100.0	100.0	100.0
-----percent by type of land holding-----				
Corn	100	42.9	9.9	47.2
Beans	100	47.1	3.1	49.8
Wheat	100	59.7	3.2	37.2
Cotton	100	64.6	0.4	35.0
Sugarcane	100	49.0	13.2	47.7
Coffee	100	58.6	12.0	29.4
Other	100	49.7	3.7	46.6
Total	100	47.7	7.0	45.3

Source: IV Censo Agricola, Ganadero y Ejidal, 1960.

Crop Yields

With the exception of coffee, crop yields per hectare were generally lower on ejidos than on privately owned farms in 1950 (Table 101). In 1960, yields varied considerably among regions, generally highest in the North Pacific region, but with the exception of lower yields of wheat and hybrid corn, those on ejidos differed very little from yields on the privately owned farms of more than five hectares. Thus very little of the income differences can be attributed to differences in crop yields. (Table 102).

Irrigation

The availability of irrigation is expected to be a major factor in influencing composition of output (because of the differences in water requirements among enterprises) as well as yields. The area under irrigation was increased substantially on the ejidos between 1930 and 1940 while it was decreased on the private farms. This change was mainly a result of the redistribution of land in the highly commercialized irrigated areas of La Laguna and similar regions by President Cardenas during his presidential term (Table 103). After 1940, the increase in the irrigated area on all types of farms was a result of the importance of irrigation in the policies of the presidents Avila Camacho, Aleman and Ruiz Cortines.

President Cardenas established by law, during his

Table 101. Indexes of Crop Yields per Hectare, by Region and Type of Land Holding, Mexico, 1950

Region and Type of Holding	Beans	Coffee ^a	Common Corn (alone)	Cotton	Sugarcane (1st crop)	Wheat
-----national average=100-----						
<u>Mexico</u>	100	100	100	100	100	100
Private	108	91	105	104	116	113
Ejidos	89	123	91	93	88	85
<u>North</u>	94	73	86	101	94	91
Private	104	69	95	114	114	96
Ejidos	86	92	74	93	89	86
<u>Gulf</u>	156	99	126	101	107	67
Private	196	74	141	128	132	76
Ejidos	134	136	117	64	82	58
<u>North Pacific</u>	145	111	128	97	90	126
Private	149	56	127	102	101	144
Ejidos	141	126	129	93	81	99
<u>South Pacific</u>	91	110	101	83	85	83
Private	76	109	105	87	87	84
Ejidos	93	115	100	60	75	49
<u>Center</u>	84	79	97	169	109	88
Private	104	77	104	94	106	100
Ejidos	61	126	86	204	115	80

^aBased on kilograms per plant in production.

Source: Calculated from data in Table 180.

Table 102. Indexes of Crop Yields per Hectare, by Region and Type of Land Holding, Mexico, 1960

Region and Type of Holding	Cotton	Sugarcane		Beans (alone)	Common Corn (interplanted) (alone)		Hybrid Corn	Wheat
		(1st Crop)	(ratoon)		national average=100			
Mexico	100	100	100	100	100	100	100	100
Private >5 ha.	100	96	104	99	98	100	106	113
Private ≤5 ha.	107	103	-	147	108	101	124	85
Ejidos	100	104	96	99	102	100	94	79
North	92	91	101	87	87	86	100	90
Private >5 ha.	93	90	104	88	94	89	120	99
Private ≤5 ha.	94	83	-	125	103	89	-	107
Ejidos	89	92	99	84	82	82	82	76
Gulf	59	85	88	150	119	114	94	39
Private >5 ha.	59	90	96	153	111	115	103	41
Private ≤5 ha.	-	87	-	182	-	115	136	65
Ejidos	59	74	80	146	122	113	88	35
North Pacific	112	107	104	146	128	144	122	121
Private >5 ha.	116	113	110	169	124	138	129	135
Private ≤5 ha.	124	91	-	189	173	168	204	99
Ejidos	119	103	99	132	129	147	119	83
South Pacific	106	91	95	85	114	99	79	60
Private >5 ha.	108	89	96	73	110	100	88	60
Private ≤5 ha.	70	81	-	169	161	86	91	61
Ejidos	101	97	95	88	116	105	64	64
Center	127	133	132	93	97	100	98	87
Private >5 ha.	124	119	136	95	94	98	101	95
Private ≤5 ha.	102	141	-	128	107	107	126	84
Ejidos	128	136	130	88	99	98	94	80

Source: Calculated from Table 181.

Table 103. Distribution of Cropland and Irrigated Cropland by Type of Land Holding, Mexico, Census Years 1930 to 1960

Item	1930	1940	1950	1960 ^a
<u>Private Holdings</u>				
Total Cropland 1,000 ha.	12,677	7,826 ^b	11,138	13,478
Irrigated Land 1,000 ha.	1,458	905 ^b	1,292	2,087
Percent Irrigated	11.5	11.6	11.6	15.5
<u>Ejidos</u>				
Total Cropland 1,000 ha.	1,940	7,045 ^b	8,791	10,392
Irrigated Land 1,000 ha.	219	994 ^b	1,212	1,428
Percent Irrigated	11.3	14.1	13.8	13.8
<u>Total</u>				
Cropland 1,000 ha.	14,618	14,871	19,928	23,817
Irrigated Land 1,000 ha.	1,677	1,899	2,504	3,515
Percent Irrigated	11.5	12.8	12.6	14.8
<u>Percent Held by Ejidos</u>				
Cropland	13.3	47.4	44.1	43.4
Irrigated Land	13.1	52.3	48.4	40.6
Total Land Value	c	c	c	34.0

^aIn 1960, privately owned farms of five hectares or less accounted for 5 percent of the cropland area, 4 percent of the irrigated cropland and 3 percent of the land values.

^bPresident Cardenas redistributed some irrigated private land in the 1930's especially in the northern part of Mexico.

^cData not available.

Source: Censo Agricola, Ganadero y Ejidal. Several years.

period, that the ejidatarios were to be given priority over the private property owners in the distribution of water in the irrigation districts. In the 1950's this law was ruled unconstitutional by the Supreme Court of Mexico. The Irrigation Law of 1947, on the other hand, specified that the amount to be paid by the beneficiaries of the irrigation districts would be according to their ability to pay; the ejidatarios were exempted and the small property owners with lots similar in size to those of the ejidatarios could also be exempted [Oribe Alba, 1960, p. 372]. In the 1950's irrigation on privately owned farms was extended more rapidly than on ejidos. Despite the facts that a higher proportion of land on the ejidos was used for crops and a nearly equal share was irrigated the value of ejidal lands amounted to a relatively smaller than proportionate share of the land value (Table 103). In 1960, it was reported that 2,087 thousand hectares on private farms were irrigated, with a total value of 1,640 million pesos or a value of 786 pesos per hectare. The value on the ejidos was considerably lower, 197 million pesos for 1,428 thousand hectares or 138 pesos per hectare [Horton, 1968, p. 18].

In 1958, it was reported that ejidatarios made up 71.6 percent of the users of facilities in the irrigation districts, but they accounted for only 41.9 percent of the area (Table 104). The other users in the irrigation districts were classified in the study as old property owners and new

Table 104. Distribution of Land and People in the Irrigation Districts, Mexico, 1958

Type of Holding and Size in Hectares	Persons		Area	
	Number	Percent	1,000 Ha.	Percent
<u>Ejidatarios</u>				
0-5	162,105	59.9	465	23.5
5.1-10	16,670	6.1	111	5.8
10.0-20	8,913	3.3	104	5.2
Over 20	6,191	2.3	146	7.4
Sub-total	193,879	71.6	829	41.9
<u>Old Property Owners</u>				
0-5	38,195	14.2	58	2.9
5.1-10	7,879	2.9	61	3.1
10.1-20	6,340	2.3	103	5.2
20.1-50	5,513	2.0	185	0.3
50.1-100	3,287	1.2	270	13.6
Over 100	314	0.1	53	2.7
Sub-total	61,528	22.7	730	36.8
<u>Colonists</u>				
0-5	1,065	0.4	3	0.1
5.1-10	1,150	0.4	10	0.5
10.1-20	7,612	2.8	116	5.9
20.1-50	4,007	1.5	119	6.0
50.1-100	1,204	0.4	86	4.4
Over 100	380	0.2	88	4.4
Sub-total	15,418	5.7	442	21.3
<u>Total</u>				
0-20	249,929	92.2	1,034	52.2
20.1-50	15,711	5.8	450	22.7
50.1-100	4,491	1.7	356	18.0
Over 100	694	0.3	142	7.1
Grand Total	270,825	100.0	1,981	100.0

Source: Oribe Alba, Alfonso "Las Obras de Irrigacion," in Mexico: 50 Anos de Revolucion, Vol. 1. La Economia (Mexico, D.F.: Fondo de Cultura Economica, 1960), p. 366.

colonists. A large percentage of the area benefited in the irrigation districts was in the hands of old property owners who had between 50 and 100 hectares. Among the new colonists, the larger percentage of the area was in farms that contained 20.1 to 50 hectares. Thus large numbers of small units, both privately held farms and ejidatarios, as well as larger units have received irrigation.

In 1960, most of the irrigated land was located in three regions: 35 percent is in the North, 31 percent in the North Pacific, and 29 percent in the Center (Table 105). The value of production per acre of cropland was highest in North Pacific, second in the North and third highest in the Center (see Table 91). On the average, the percentage of land that was irrigated was much higher on private farms than on ejidos in the North Pacific. This accounts for most of the difference between ejidos and privately owned lands. The percentage of cropland classified as humid is somewhat higher on ejidos than on private holdings. Of the area covered by irrigation works in 1960, 81 percent was actually irrigated on the private farms of more than five hectares and only 63 percent on the ejidos (Table 106).

Fertilizer, Disease and Pest Control, and Insurance

Between 1940 and 1950, the area fertilized on private farms was more than doubled, while the increase on the ejidos was less than one-fourth. Between 1950 and 1960, the

Table 105. Cropland Classification, by Region, Type of Land, and Type of Land Holding, Mexico, 1960

Region and Type of Holding	Total Irrigated Humid Seasonal				% of Total Within Type of Holding	
	1,000 hectares				Irrigated Humid	
<u>Mexico</u>	23,817	3,515	893	19,408	14.8	3.7
Private						
>5 ha.	12,219	1,951	350	9,918	16.0	2.9
≤5 ha.	1,269	137	107	1,026	10.8	8.4
Ejidos	10,329	1,428	437	8,465	13.8	4.2
<u>North</u>	5,932	1,231	77	4,624	20.8	1.3
Private						
>5 ha.	3,343	733	49	2,561	21.9	1.5
≤5 ha.	104	24	1	78	23.1	1.0
Ejidos	2,485	474	27	1,985	19.1	1.1
<u>Gulf</u>	4,256	32	349	3,875	0.8	8.2
Private						
>5 ha.	2,287	11	138	2,138	0.5	6.0
≤5 ha.	157	2	74	81	1.3	47.1
Ejidos	1,812	19	138	1,656	1.0	7.6
<u>North Pacific</u>	2,489	1,099	108	1,282	44.2	4.3
Private						
>5 ha.	1,365	738	18	610	54.1	1.3
≤5 ha.	29	14	1	14	48.3	3.4
Ejidos	1,095	347	89	658	31.7	8.1
<u>South Pacific</u>	4,590	152	210	4,228	3.3	4.6
Private						
>5 ha.	2,639	84	97	2,458	3.2	3.7
≤5 ha.	329	19	12	298	5.8	3.6
Ejidos	1,622	49	101	1,473	3.0	6.2
<u>Center</u>	6,539	1,001	150	5,398	15.3	2.3
Private						
>5 ha.	2,585	385	49	2,151	14.9	1.9
≤5 ha.	649	77	18	554	11.9	2.8
Ejidos	3,314	539	82	2,692	16.3	2.5

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 106. Irrigation, by Land Holding Classes, Mexico, 1960

Region and Type of Holding ^a	Irrigated Area		Actually Irrigated	
	-----1,000 hectares-----		(percent)	
<u>Mexico</u>	3,379	2,475	73	
Private >5 ha.	1,951	1,573	81	
Ejidos	1,428	903	63	
<u>North</u>	1,207	812	67	
Private >5 ha.	733	540	74	
Ejidos	474	272	57	
<u>Gulf</u>	29	24	83	
Private >5 ha.	11	9	82	
Ejidos	19	15	79	
<u>North Pacific</u>	1,085	886	82	
Private >5 ha.	738	639	87	
Ejidos	347	247	71	
<u>South Pacific</u>	133	96	72	
Private >5 ha.	84	57	68	
Ejidos	49	39	80	
<u>Center</u>	924	657	71	
Private >5 ha.	385	328	85	
Ejidos	539	390	72	

^aData not available for private farms of five hectares and less.

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

increases in area fertilized was more than tripled on both groups of farms (Table 107).

Fertilizers were used most intensively in the North Pacific region and least intensively in the South Pacific region (Table 108).

In 1960, expenditures per hectare of cropland for fertilizers on the privately owned farms of more than five hectares was nearly three times the amount spent on the ejidos (Table 109). The expenditures per hectare on pest and disease control was also substantially higher on the privately owned farms. In the case of crop insurance the expenditures were almost equal between these two groups of farms.

Crop and Livestock Losses

The area of crops lost due to frosts, droughts, floods, pests, diseases and other factors in 1960 amounted to 10.2 percent of the area cultivated on the private holdings and 15.5 percent on the ejidos (Table 110). In three of the four census years the relative losses on the ejidos were substantially higher than those on the privately owned farms. The major causes of losses in 1960 were droughts in the North and Center, pests and diseases in the Center, and frosts in the North and floods in the Center (Table 111). Also, the ejidos and small private owners incurred livestock losses that were disproportionately larger than those on the private holding of more than five hectares (Table 112).

Table 107. Index of the Number of Acres Fertilized on Private Farms and on Ejidos, Mexico, 1940 to 1960

Type of Holding	1940	1950	1960
Private Farms	100.0	224.0	887.8
Ejidos	100.0	100.0	363.9
		124.5	420.3
		100.0	337.6

Source: Mueller, Marnie W. "Changing Patterns of Agricultural Output and Productivity in the Private and Land Reform Sectors in Mexico, 1940-1960," Economic Development and Cultural Change, Vol. 18, No. 2 (Jan. 1970), p. 258.

Table 108. Area Fertilized, by Region, Mexico, 1960

Regions	Area Harvested	Area Fertilized	Percent of Harvested Area Fertilized
	-----1,000 hectares-----		
North	2,754	353	13.7
Gulf	1,078	117	11.1
North Pacific	1,310	456	34.6
South Pacific	1,542	96	6.2
Center	3,690	760	20.6
Total	10,375	1,782	17.3

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 109. Expenditures for Fertilizers, Insecticides, and Insurance, by Type of Land Holding, Mexico, 1960

Type of Holding	Fertilizers and Land Improvers	Insecticides, Pesticides and Disinfectants	Insurance Premiums
-----Total 1,000 pesos-----			
Mexico ^a	282,884	168,543	101,447
Private >5 ha.	213,588	115,286	53,438
Ejidos	69,296	53,257	48,009
-----Percent of Total-----			
Ejidos	24	32	47
-----Per Hectare of Cropland, pesos-----			
Mexico	12.5	7.5	4.5
Private >5 ha.	17.5	9.4	4.5
Ejidos	6.7	5.2	4.6

^aData were not available for private farms of five hectares and less.

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 110. Area of Crops Lost, by Type of Land Holding,
Mexico, Census Years 1930 to 1960

Year and Type of Holding	Area Lost	Area Cultivated	Percent Lost
-----1,000 hectares-----			
<u>1930</u>			
Private	949	6,072	15.4
Ejidos	291	1,094	26.9
<u>1940</u>			
Private >5 ha.	546	4,024	13.5
Ejidos	688	4,878	14.1
<u>1950</u>			
Private >5 ha.	450	4,641	9.8
Ejidos	980	5,312	18.4
<u>1960</u>			
Private >5 ha.	657	6,414	10.2
Ejidos	1,036	6,507	15.5

Source: Censo Agrícola, Ganadero y Ejidal. Several Years.

Table 111. Area of Crops Lost, by Region, Type of Land Holding, and Type of Loss, Mexico, 1960

Region and Type of Holding	Total	Frosts	Drought	Floods	Pests and Diseases		
					Hail	Other	
-----1,000 hectares-----							
Mexico	1,693	258	808	288	281	55	71
Private	657	61	355	77	113	19	32
Ejidos	1,036	196	454	143	168	36	39
North	717	106	460	32	86	16	18
Private	324	30	214	17	44	7	11
Ejidos	393	76	246	15	41	8	6
Gulf	133	24	76	18	6	1	8
Private	33	5	19	5	2	a	2
Ejidos	100	19	57	13	4	1	6
North Pacific	157	20	58	45	21	1	13
Private	78	5	36	21	9	a	7
Ejidos	79	16	22	24	12	a	5
South Pacific	92	9	38	22	11	2	10
Private	29	1	16	5	3	a	3
Ejidos	62	8	22	16	8	1	7
Center	595	98	177	104	157	37	22
Private	193	20	70	30	55	11	8
Ejidos	402	78	107	74	102	25	15

^a Less than 500.Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 112. Value of Losses of Cattle and Poultry, by Type of Land Holding, Mexico, 1960

Type of Holding	Value of Losses			Percent of Total Inventory
	Total	Cattle	Poultry	
-----million pesos-----				
<u>Mexico</u>	750.2	633.8	116.4	4.7
Private				
>5 hectares	353.4	330.5	23.0	3.6
≤5 hectares	89.1	58.8	30.3	6.8
Ejidos	307.7	244.6	63.1	5.8

Source: IV Censo Agricola Ganadero y Ejidal, 1960.

Capital Stock and Investment

Land accounted for 72 percent of the total investment on farms in 1960 (Table 113). The second largest item was livestock, mostly cattle. Between 1940 and 1960, the shares accounted for by land and machinery increased and by livestock and fixed capital decreased. While the ejidos and the private farms with more than five hectares had similar amounts of fixed capital, machinery and implements in 1940, the situation had changed by 1960. Of the total fixed capital, almost 70 percent was in the hands of the larger private farms, while the ejidos had only 20 percent, and the smaller private farms only 10.4 percent. The relatively high investments in livestock on small private farms was heavily weighted by work animals.

Total value of land per hectare of cropland was highest on the larger private holdings and lowest on small private holdings (Table 114). However, the relative values were reversed when pasture land was included. On the basis of cropland, it was somewhat surprising to find that the highest values were in the Gulf region and the lowest values were in the densely populated Center.

Among the components of fixed capital in 1960, over 50 percent of the value of buildings, over 80 percent of the private railroads and roads, and over 85 percent of the irrigation investments and facilities were located on the

Table 113. Percentage Distribution of the Value of the Land and Capital on Farms,
by Type of Land Holding, Mexico, 1940, 1950 and 1960

Year and Type of Holding	Within Type of Land Holding				
	Total	Land	Fixed Capital ^a	Machinery	Implements Livestock ^b
percent					
<u>1940</u>					
Total	100	63.4	7.4	2.4	0.8 26.0
Private					
>5 ha.	100	76.6	7.0	2.4	0.7 13.3
≤5 ha.	100	19.1	n.a.	0.8	n.a. 80.1
Ejidos	100	66.6	11.5	3.4	1.4 17.0
<u>1950</u>					
Total	100	76.5	4.1	4.0	0.7 14.7
Private					
>5 ha.	100	78.0	4.9	4.5	0.4 12.2
≤5 ha.	100	60.6	n.a.	3.6	n.a. 35.8
Ejidos	100	76.3	3.3	3.1	1.3 16.0
<u>1960</u>					
Total	100	71.9	4.2	4.9	0.3 18.7
Private					
>5 ha.	100	72.3	4.6	5.2	0.1 17.7
≤5 ha.	100	50.0	10.3	2.5	2.1 35.1
Ejidos	100	74.0	2.5	4.6	0.5 18.4

Table 113. Continued.

Year and Type of Holding	Among Types of Land Holding					Livestock
	Total	Land	Fixed Capital	Machinery	Implements	
percent						
1940						
Total	100	100	100	100	100	100
Private						
>5 ha.	48.9	59.0	46.4	46.7	41.7	25.1
≤5 ha.	17.0	5.1	n.a.	5.6	n.a.	52.5
Ejidos	34.1	35.9	53.6	47.7	58.3	22.4
1950						
Total	100	100	100	100	100	100
Private						
>5 ha.	59.6	60.7	71.0	67.4	36.0	49.5
≤5 ha.	4.8	3.8	n.a.	4.4	n.a.	11.7
Ejidos	35.6	35.5	29.0	28.2	64.0	38.8
1960						
Total	100	100	100	100	100	100
Private						
>5 ha.	62.8	63.1	69.6	67.0	24.7	59.5
≤5 ha.	4.2	3.0	10.4	2.2	27.5	8.0
Ejidos	32.9	33.9	20.0	30.8	47.8	32.5

^a Includes buildings, structures, roads, railroads, and irrigation facilities.

^b Excludes livestock in towns as reported in 1950 and 1960; livestock in towns is included in 1940 as it was not reported separately.

n.a. Data not available.

Source: Censo Agrícola, Ganadero y Ejidal. Several years.

Table 114. Land Values, by Region and Type of Land Holding, Mexico, 1960

Region and Type of Holding	Total	Land Value			
		Per Hectare			
		Crops	Crops and Pasture		
	(mil. pesos)	(pesos)	(index)	(pesos)	(index)
<u>Mexico</u>	63,444	2,664	100	617	100
Private					
>5 ha.	40,068	3,279	123	559	91
≤5 ha.	1,875	1,478	55	1,437	233
Ejidos	21,501	2,082	78	718	116
<u>North</u>	15,778	2,660	100	303	49
Private					
>5 ha.	10,862	3,249	122	280	45
≤5 ha.	127	1,221	46	1,165	189
Ejidos	4,789	1,927	72	368	60
<u>Gulf</u>	17,198	4,041	152	1,950	316
Private					
>5 ha.	10,457	4,572	172	1,869	303
≤5 ha.	361	2,299	86	2,228	361
Ejidos	6,380	3,521	132	2,085	338
<u>North Pacific</u>	7,499	3,013	113	451	73
Private					
>5 ha.	5,224	3,827	144	387	63
≤5 ha.	60	2,069	78	2,000	324
Ejidos	2,215	2,023	76	715	116
<u>South Pacific</u>	9,999	2,178	82	934	151
Private					
>5 ha.	7,685	2,912	109	1,154	187
≤5 ha.	227	690	26	686	111
Ejidos	2,086	1,268	48	561	91
<u>Center</u>	12,970	1,980	74	879	142
Private					
>5 ha.	5,839	2,259	85	830	135
≤5 ha.	1,099	1,693	64	1,635	265
Ejidos	6,032	1,805	68	854	138

^aAverage of Mexico = 100 .

Source: IV Censo Agricola, Ganadero y Ejidal, 1960.

larger private farms (Table 115). These shares are in contrast to the ejidos holdings of 43.4 percent and 40.6 percent respectively of the cropland and the irrigated land (See Table 103).

Eighty percent of the tractors in 1960 compared with 84 percent in 1950 were located on the larger private farms (Table 116). In general, the larger private farms, in 1960, had a larger than proportionate share of the more modern and motorized machinery and vehicles. On the other hand, 72.2 percent of the electric power was located on ejidos in the North region (Table 117).

Although there were no ejidos that used only mechanical power, compared with 10.8 percent of the larger private holdings, 22.2 percent used some mechanical power. Despite the fact that the larger private farms had a larger share of tractors, animal power alone was used on 70 percent of the area compared with 71 percent on ejidos and 95 percent on the smaller private farms (Table 118). The 1960 Census reported approximately 3.5 million work animals—including bulls, cows, mares, horses and mules. Of this total number of animals, 41 percent were located on the ejidos, 29 percent on the larger private farms, 12 percent on the smaller private farms, and the remainder was located in towns and villages (Table 119). As might be expected, on the basis of the distribution of tractors, work animals were used most

Table 115. Capital Stock in Agriculture, by Region and Type of Holding, Mexico, 1960

Region and Bldg. Type and of Holding	Struct. Railroads and Roads for	Equip. Irrig. Veh.	Equip., Imple- ments	Cattle	Poultry	Bee- hives	Total	% of Total		
million pesos								(%)		
Mexico	1,691	71	1,922	4,317	288	20,200	769	85	29,343	100.0
Private										
>5 ha.	866	58	1,640	2,893	71	9,630	152	24	15,334	52.3
≤5 ha.	385	-	-	93	79	1,209	103	6	1,875	6.4
Ejidos	441	13	282	1,331	137	5,106	231	17	7,558	25.8
In Town	-	-	-	-	-	4,256	283	38	4,577	15.6
North	402	16	910	1,706	76	6,181	139	18	9,448	32.2
Private										
>5 ha.	244	12	790	1,176	27	3,291	42	3	5,585	19.0
≤5 ha.	54	-	-	10	8	121	14	1	208	0.7
Ejidos	104	4	120	519	41	1,681	33	6	2,508	8.5
In Towns	-	-	-	-	-	1,088	50	9	1,147	3.9
Gulf	212	25	59	302	29	3,367	179	35	4,208	14.3
Private										
>5 ha.	131	22	55	208	7	2,088	26	18	2,555	8.7
≤5 ha.	36	-	-	3	7	59	7	1	113	0.4
Ejidos	45	3	3	90	16	669	71	4	901	3.1
In Towns	-	-	-	-	-	552	74	12	638	2.2
N. Pacific	253	7	445	1,036	29	2,512	67	2	4,351	14.8
Private										
>5 ha.	186	6	413	798	12	1,504	21	a	2,940	10.0
≤5 ha.	11	-	-	7	3	54	4	a	79	0.3
Ejidos	56	1	32	232	14	478	14	1	828	2.8
In Towns	-	-	-	-	-	477	27	1	505	1.7

Table 115. Continued.

Region and Bldg. Type of Holding	Struct. Railroads and Roads for Irrig.	Mach., Equip., Veh.	Imple- ments	Cattle	Poultry	Bee- hives	Total	% of Total
million pesos								(%)
S. Pacific	149	8	49	2,016	110	4	2,593	8.8
Private								
>5 ha.	80	7	44	770	17	1	1,068	3.6
≤5 ha.	27	-	-	299	15	1	364	1.2
Ejidos	42	1	5	461	40	1	634	2.2
In Towns	-	-	-	486	37	1	524	1.8
Center	675	14	459	6,124	275	26	8,743	29.8
Private								
>5 ha.	225	11	338	1,977	45	3	3,186	10.9
≤5 ha.	258	-	-	676	63	3	1,111	3.8
Ejidos	193	3	121	1,817	72	6	2,684	9.1
In Towns	-	-	-	1,653	95	15	1,763	6.0
percent of total for Mexico								
Total	5.8	0.2	6.6	68.8	2.6	0.3	100.0	-

^aLess than one-half million.Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 116. Number and Value of Machinery, Implements and Vehicles on Farms, by Type of Land Holding, Mexico 1960

Item	Total			> 5 Hectares			4-5 Hectares			Ejidos		
	Number	Value		Number	Value		Number	Value		Number	Value	
	(1,000)	(mil.)	Pesos	(1,000)	(mil.)	Pesos	(1,000)	(mil.)	Pesos	(1,000)	(mil.)	Pesos
Plows with Iron												
Mouldboard	1,224	311		353	92		180	34		691	185	
Iron Discs	62	174		45	131		-	-		17	43	
Wooden Discs	1,100	81		305	24		283	17		513	41	
Planters	93	112		53	74		7	5		32	33	
Iron Harrows	84	217		44	131		8	12		32	74	
Cultivation Machines	224	348		103	150		15	25		106	173	
Mechanical Threshers												
Fixed	5	86		5	69		-	-		a	17	
Combines	4	181		3	159		-	-		1	22	
Mowing Machines	10	29		6	20		-	-		4	9	
Shellers, Motor	5	12		4	9		-	-		1	2	
Shellers, Hand	9	6		6	4		-	-		3	2	
Forage Picking Tools	6	28		5	24		-	-		1	4	
Forage Picking Machines	5	36		4	29		-	-		1	7	
Carts and Wagons	211	232		99	112		-	-		111	120	
Trucks	40	763		24	511		-	-		14	251	
Tractors	55	1,410		44	1,145		-	-		11	265	
Motors	18	200		12	133		-	-		6	68	
Others	-	91		-	76		-	-		-	15	
Total		4,317			2,893			93			1,331	
Total		100.0		Percent of Total Value				2.2			30.8	

^aLess than 500.

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 117. Mechanical and Electrical Power in Agriculture, by Regions and Type of Land Holding, Mexico, 1960

Region and Type of Holding	Tractors	Other Internal Combustion Engines	Electric	% of Total	
				Tractors	Electricity
---1,000 horsepower-- (kilowatts)					
<u>Mexico</u>	1,738	131	43,772	100.0	100.0
Private					
>5 ha.	1,405	84	6,215	80.8	14.2
≤5 ha.	—	—	—	—	—
Ejidos	333	47	37,557	19.2	85.8
<u>North</u>	842	66	34,958	48.5	79.9
Private					
>5 ha.	695	36	3,388	40.1	7.7
≤5 ha.	—	—	—	—	—
Ejidos	147	30	31,570	8.4	72.2
<u>Gulf</u>	97	8	149	5.6	0.3
Private					
>5 ha.	79	7	88	4.5	0.2
≤5 ha.	—	—	—	—	—
Ejidos	18	1	61	1.1	0.1
<u>N. Pacific</u>	381	21	2,318	21.9	5.3
Private					
>5 ha.	302	17	1,000	17.4	2.5
≤5 ha.	—	—	—	—	—
Ejidos	79	4	1,218	4.5	2.8
<u>S. Pacific</u>	61	11	439	3.5	1.0
Private					
>5 ha.	52	10	83	3.0	0.2
≤5 ha.	—	—	—	—	—
Ejidos	9	1	356	0.5	0.8
<u>Center</u>	357	24	5,908	20.5	13.5
Private					
>5 ha.	277	14	1,556	15.9	3.6
≤5 ha.	—	—	—	—	—
Ejidos	80	10	4,352	4.6	9.9

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 118. Number of Farms and Farm Area, by Type of Power and Type of Land Holding, Mexico, 1960

Type of Holding	Total Farms		Percent of Total Within Holding	
	Number	Hectare	Number	Hectare
	-----1,000-----		-----percent-----	
Mexico	869	19,707	100.0	100.0
Private				
>5 ha.	288	8,916	100.0	100.0
≤5 ha.	563	825	100.0	100.0
Ejidos	18	9,966	100.0	100.0

Animal Power Only				

Mexico	804	14,029	92.5	71.2
Private				
>5 ha.	239	6,205	83.0	69.6
≤5 ha.	551	787	97.9	95.4
Ejidos	14	7,037	77.8	70.6

Mechanical Power Only				

Mexico	36	1,607	4.2	8.2
Private				
>5 ha.	31	1,596	10.8	17.9
≤5 ha.	5	11	0.9	1.3
Ejidos	-	-	-	-

Mixed Power				

Mexico	29	4,070	3.3	20.6
Private				
>5 ha.	18	1,116	6.2	12.5
≤5 ha.	7	27	1.2	3.3
Ejidos	4	2,928	22.2	29.4

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 119. Number and Value of Work Animals, by Type of Land Holding, Mexico, 1960

Type of Holding	Cropland per Animal	Number		Value	
		(hectare)	(1,000) (%)	(mil. pesos)	(%)
<u>Mexico</u>	-	3,496	100.0	2,396	100.0
Private >5 ha.	12.0	1,016	29.0	665	27.8
Private ≤5 ha.	2.9	432	12.4	299	12.5
Ejidos	7.2	1,443	41.3	991	41.4
Towns	-	605	17.3	441	18.3

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

intensively on the smaller private farms (one for each 2.9 hectares of cropland) and least intensively on the larger private farms (one for each 12.0 hectares). Yields of alfalfa, beans, corn, and sugarcane were much higher on mechanized farms than on the small non-mechanized farms (Table 120). The reasons for these differences were not given, but must have been due to complementary inputs as there is no logical reason to expect mechanization alone to result in such wide differences.

The numbers of livestock reported by ejidos in comparison with private farms in 1960 were approximately in proportion to the distribution of pastures (Table 121). While the number of hectares of pasture per grazing animal (cattle, sheep, and goats) was somewhat lower on ejidos, the ratio of cattle to the smaller animals was lower, also. Only 4.6 percent of cattle on ejidos were classed as "high quality" cattle compared with 15.1 percent as the national average and 19.0 percent on the private farms of more than five hectares (Table 122).

Agricultural Credit

Credit is the important means of purchasing inputs used in the production process. Credit to the ejidos was increased rather slowly in the 1940's, but was nearly tripled between 1950 and 1959 (Table 123). However, the agricultural credit extended to the ejidos as a percentage of total agricultural credit, in 1942 to 1959, averaged 20.5 percent in the 1940's

Table 120. Yields per Hectare of Selected Crops, on Small and on Mechanized Farms, Mexico, 1944-1955

Crop	Mechanized Farms	Smallest Farms
	1944-1955	1950
1,000 kgs.		
Alfalfa	90.0	42.5
Beans	2.3	0.6
Corn	5.4	0.9
Sugarcane	184.4	54.0

Source: Yanez-Perez, Luis. Mecanizacion de la Agricultura Mexicana (Mexico, D.F.: Instituto Mexicano de Investigaciones Economicas, 1957), p. 178.

Table 121. Number of Livestock, Total and on Ejidos,
Mexico, 1960

Class	Total	Ejidos	
		Number	Percent of Total
	(1,000)	(1,000)	(percent)
Cattle	16,009	3,297	21
Sheep	5,169	1,939	38
Goats	9,732	3,793	39
Horses	2,489	983	40
Burros (asses)	2,208	957	43
Poultry	29,705	8,321	28
Hectares of Pasture per Animal			
	<u>Total</u>	<u>Ejido</u>	
Cattle	4.9	5.9	-
Sheep	15.3	10.1	-
Goats	8.1	5.2	-
Total	2.6	2.2	-

Source: IV Censo Agricola, Ganadero y Ejidal, 1960.

Table 122. Cattle Population, by Quality and Type of Land Holding, Mexico, 1960

Type of Holding	Total ^a		High Quality		Percent High Quality	
	Number	Value	Number	Value	Number	Value
	Total	Per Head	Total	Per Head	Total	Per Head
	(1,000)	(mil. pesos)	(1,000)	(mil. pesos)	-----	percent
Mexico	16,009	12,178	2,412	3,855	15.1	31.7
Private						
75 ha.	9,790	7,688	1,857	2,855	19.0	37.1
25 ha.	862	548	96	157	11.1	28.6
Ejidos	3,297	2,162	153	257	4.6	11.9
Towns	2,061	1,779	305	586	14.8	32.9

^aThe Census reported that the data showed abnormally high underestimation.

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 123. Indexes of Real Credit Extended to Ejidos, Mexico,
1940 to 1959

Year	Index	Year	Index
	(1940=100)		(1950=100)
1940	100.0	1950	100.0
1941	99.8	1951	110.4
1942	97.3	1952	103.1
1943	122.6	1953	163.7
1944	105.1	1954	193.3
1945	94.4	1955	188.0
1946	98.9	1956	248.6
1947	127.7	1957	242.0
1948	124.5	1958	225.6
1949	130.0	1959	293.1

Source: Mueller, Marnie W. "Changing Patterns of Agricultural Output and Productivity in the Private and Land Reform Sectors in Mexico, 1940-1960," Economic Development and Cultural Change, Vol. 18, No. 2 (Jan. 1970), p. 257.

and 21.8 percent in the 1950's--a much smaller percentage than the share of cropland held by the ejidos (Table 124). The Banco Nacional de Credito Ejidal (BNCE) supplied credit to some of the ejidatarios. When the Ejidal Bank was created in 1936, the law specified that this agency was to supervise the interior organization of the ejidos with whom it operated. The local credit societies were to be established in order for the ejidatarios to obtain credit from the BNCE. The local credit societies were to be cooperatives, and it was expected that later these societies would be developed into production cooperatives.

By 1960 more than 9,000 local credit societies had been established, but only about half were in existence as half of those established earlier had disappeared (Table 125). The majority of these units were designed to satisfy the legal requirements of the BNCE.

Table 126 shows the distribution of credit by type of land holding and by source of credit. The larger private farms received almost 60 percent of the total credit in 1960. Government institutions were the major sources of credit for ejidos, whereas private institutions were the major sources for the larger private farms. Only 793,000 ejidal hectares, in a total of 10 million hectares, were included in units that received credit. The legal restriction, that ejidal lands could not be mortgaged, limited ejidal credit mainly to the Banco Nacional de Credito Ejidal.

Table 124. Percentage of Total Agricultural Credit Extended to Ejidos, Mexico, 1942-1959

<u>1942-49</u>		<u>1950-59</u>	
Year	Percent	Year	Percent
1942	15.9	1950	19.2
1943	19.6	1951	22.3
1944	14.4	1952	17.7
1945	18.6	1953	20.5
1946	22.4	1954	25.5
1947	25.3	1955	21.6
1948	24.3	1956	25.7
1949	<u>23.4</u>	1957	23.4
		1958	20.3
		1959	<u>21.5</u>
Average	20.5	Average	21.8

Source: Mueller, Marnie W. "Changing Patterns of Agricultural Output and Productivity in the Private and Land Reform Sectors in Mexico, 1940-1960," Economic Development and Cultural Change, Vol. 18, No. 2, p. 257.

Table 125. Local Ejidal Societies, Mexico, 1953-1960

Year	Ejidal Societies			Members of Ejidal Societies			Amount of Credit
	Total In Existence	Receiving Credit from BNCE		Total	Receiving Credit from BNCE		
		Number	%		Number	%	
				(1,000)	(1,000)	(mil. pesos)	
1953	7,434	4,757	64	565	313	55	420
1954	7,991	5,808	73	471	348	74	544
1955	8,114	4,992	62	574	335	58	605
1956	8,459	4,642	55	591	337	57	834
1957	8,359	4,367	52	585	273	47	844
1958	8,599	4,353	51	610	271	44	822
1959	9,014	5,009	56	654	347	53	1,080
1960	9,069	4,922	54	668	370	55	1,249

Source: Albornoz de la Escosura, Alvaro. Trayectoria y Ritmo del Credito Agricola en Mexico. (Mexico, D.F.: Instituto Mexicano de Investigaciones Economicas, 1966), pp. 289-290.

Table 126. Distribution of Farm Credit by Source and Type of Land Holding, Mexico, 1960

Type of Holding	Total	Government Institutions	Private Institutions	Individuals
-----percentage by source-----				
Private ^a	100.0	27.9	56.1	16.0
Ejido	100.0	58.0	22.2	19.8
Total	100.0	40.1	42.4	17.5
-----percentage by type of holding-----				
Private ^a	59.3	41.2	78.6	54.1
Ejido	<u>40.7</u>	<u>58.8</u>	<u>21.4</u>	<u>45.9</u>
Total	100.0	100.0	100.0	100.0

^aFarms with more than five hectares.

Source: Calculated from data in Table 127.

Regionally, the North Pacific and the North received the largest shares of credit (Table 127). These regions contain the most commercialized areas of farming.

The Banco Nacional de Credito Ejidal has incurred substantial losses from loans not repaid (Table 128). These unpaid loans could be considered as a government subsidy to the ejidatarios.

Summary of Factor Proportions and Input-Output Ratios

On the basis of total labor, the ejidos held a less than proportionate share of capital and cropland plus pasture, and about a proportionate share of cropland and produced a less than proportionate share of output (Table 129). However, the ejidal share of each of these items exceeded its share of labor, when workers on ejidos who got more than half their income from outside sources were eliminated. On the small private farms, the share of each of these items in relation to labor was much smaller than on the ejidos.

The value of output per worker was highest on the large private farms, next to highest on the ejidos and lowest on the private farms with five hectares or less (Table 130). The major explanation of the differences, among types of holdings, in income per worker appears to be the differences in the amount of capital and land used per worker. On the ejidos, the capital and cropland per worker were much

Table 127. Amount of Agricultural Credit, by Region, Type of Land Holding and Source, Mexico, 1960

Region and Type of Holding	Percent of Total	Total	Government Institutions	Private Institutions	Individuals
(percent)					
Mexico	100.0	2,687	1,078	1,138	471
Private	59.3	1,594	444	895	255
Ejidos	40.7	1,093	634	243	216
North	27.7	744	286	338	120
Private	20.2	542	146	309	87
Ejidos	7.5	202	140	29	33
Gulf	16.4	439	311	72	56
Private	5.1	137	70	41	25
Ejidos	11.3	303	241	31	31
North Pacific	38.0	1,021	263	608	151
Private	24.4	656	124	459	73
Ejidos	13.6	366	139	149	78
South Pacific	5.8	157	66	42	49
Private	3.7	100	43	32	25
Ejidos	2.1	58	23	11	24
Center	12.1	325	151	78	96
Private	6.0	160	60	54	47
Ejidos	6.1	165	92	24	49

^aPrivate holdings are farms over five hectares; data are not available for units of five hectares and less.

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 128. Amount of Loans Made by Ejidal Banks and Amounts not Repaid, Mexico, 1941, 1951 and 1961

Year	Amount		Percentage Not Repaid	Area Covered by Loans
	Loans	Not Repaid		
	---million pesos---		(percent)	(1,000 hectares)
1941	167	47	27.4	794
1951	240	37	15.4	509
1961	476	150	31.5	793

Source: Banco Nacional de Credito Ejidal, Boletin de Estudios Especiales, Several dates.

Table 129. Percentage Distribution of Output and Inputs, by Type of Land Holding, Mexico, 1960

Type of Holding	Value of Output ^a	Cropland	Cropland and Pasture	Capital ^b	Labor ^c	
					A	B
Mexico	100.0	100.0	100.0	100.0	100.0	100.0
Private						
>5 ha.	56.5	51.3	69.6	61.9	27.6	35.1
≤5 ha.	6.8	5.3	1.3	7.6	28.0	37.8
Ejido	36.7	43.4	29.1	30.5	44.4	27.1

^aGross value of crop and livestock production, excluding livestock in towns.

^bBuildings and structures, roads and railroads, structures and equipment for irrigation, machinery and vehicles, implements, cattle, poultry, and beehives; excludes livestock in towns.

^cLabor is based on data in Table 130 for A and Table 182 for B.

Source: Calculated from data in Table 130 for all items except Labor-B.

Table 130. Input-Output Ratios in Agriculture, Mexico, 1960

Item	Private		Ejidos	Mexico
	>5 ha.	≤5 ha.		
<u>Totals</u>				
Capital ^a , mil. pesos	15,334	1,874	7,558	24,767
Land:				
Value, mil. pesos	40,068	1,875	21,501	63,444
Crops, 1,000 ha.	12,219	1,269	10,329	23,817
Crops and pasture, 1,000 ha.	71,662	1,305	29,943	102,909
<u>Total Workers^b, 1,000</u>	2,211	2,234	3,545	7,990
Family, 1,000	994	2,104	2,870	5,968
Full-time hired 1,000	1,217	130	675	2,022
<u>Output^c, mil. pesos</u>	10,832	1,309	7,038	19,179
<u>Capital/Output Ratio</u>	1.4	1.4	1.1	1.3
<u>Per Worker:</u>				
Output, pesos	4,899	586	1,985	2,400
Capital, pesos	6,935	839	2,132	3,100
Crops, ha.	5.5	0.6	2.9	3.0
<u>Per ha. Crops</u>				
Capital, pesos	1,255	1,477	732	1,040
Workers, no.	0.8	1.76	0.4	0.34
Output, pesos	886	1,032	681	805
<u>Per 1,000 Pesos Output:</u>				
Crops, ha.	1.1	1.0	1.5	1.2
Crops & pasture, ha.	6.6	1.0	4.3	5.4
Value of land, pesos	3,699	1,432	3,055	3,308
Capital, pesos	1,416	1,432	1,074	1,291
Workers, no.	0.20	1.71	0.50	0.42

^aBuildings and structures, roads and railroads, structures and equipment for irrigation, machinery and vehicles, implements, cattle, poultry, and beehives excludes livestock in towns.

^bSee Table 87 for explanation of workers included.

^cGross value of crop and livestock production excludes forestry and livestock in towns.

Source: Table 87 and 93, and 182 and 183 in the Appendix.

higher than was found on the private farms with five hectares or less but well below the levels found on the larger private farms.

To produce a gross value of 1,000 pesos the ejidos used more cropland, less investment in land, less capital and much more labor than did the private farms of five hectares or more. In comparison with the smaller private holdings, the ejidos used more cropland, more investment in land, less capital and less labor.

When ejidal workers with more than half their income earned from outside sources were excluded, the cropland per worker was slightly larger than that on the larger private farms and output per worker was 80 percent of the output per worker on the larger private farms (Table 131). There were quite wide variations among regions. In the North Pacific, the cropland and output per worker were higher on ejidos than on the larger private farms. The capital per worker, among regions, was consistently highest on the larger private farms, second on ejidos and lowest on the small private farms. The capital/output ratio was consistently lowest on the ejidos.

To produce a given value of output, the ejidos, in comparison with larger private farms, tended to use more cropland and less capital, and in the nation, more labor; in two regions the ejidos used less labor (Table 132).

Table 131. Inputs and Output Per Worker and Per Hectare of Cropland, by Regions and Type of Land Holding, Mexico, 1960

Region and Type of Holding	Per Worker		Per Hectare of Cropland		Capital/Output Ratio
	Capital (pesos)	Cropland (ha.)	Output (pesos)	Workers (No.)	
<u>Mexico</u>					
Private >5 ha.	4,439	4.3	3,627	850	0.23
Private ≤5 ha.	7,815	6.2	5,965	958	0.16
Ejidros	1,123	0.6	622	1,032	1.66
	4,999	6.8	4,776	699	0.15
<u>North</u>					
Private >5 ha.	8,683	6.2	6,021	970	0.16
Private ≤5 ha.	10,027	6.0	7,294	1,215	0.17
Ejidros	2,311	1.2	1,611	1,394	0.87
	8,117	8.0	5,010	623	0.12
<u>Gulf</u>					
Private >5 ha.	4,882	5.8	4,401	756	0.17
Private ≤5 ha.	8,242	7.4	5,103	692	0.14
Ejidros	571	0.8	773	975	1.26
	4,040	8.1	6,646	818	0.12
<u>North Pacific</u>					
Private >5 ha.	11,729	7.6	9,835	1,296	0.13
Private ≤5 ha.	13,868	6.4	9,759	1,516	0.16
Ejidros	3,038	1.1	2,192	1,966	0.90
	9,200	12.2	12,222	1,005	0.08
<u>South Pacific</u>					
Private >5 ha.	2,222	4.9	2,926	593	0.20
Private ≤5 ha.	3,898	0.6	5,547	576	0.10
Ejidros	839	0.8	622	821	1.32
	2,856	7.3	4,194	574	0.14
<u>Center</u>					
Private >5 ha.	2,650	2.5	2,017	811	0.40
Private ≤5 ha.	5,214	4.2	4,043	956	0.24
Ejidros	820	0.5	504	1,052	2.09
	4,018	5.0	3,234	652	0.20

Source: Calculated from Table 182 in the Appendix.

Table 132. Inputs Per 1,000 Pesos of Output in Agriculture, Mexico, 1960

Region and Type of Holding	Cropland (hectare)	Value of Land (pesos)	Capital (pesos)	Workers (number)
<u>Mexico</u>	1.18	3,136	1,224	0.28
Private				
>5 ha.	1.04	3,424	1,310	0.17
≤5 ha.	0.97	1,432	1,432	1.61
Ejidos	1.43	2,978	1,047	0.21
<u>North</u>	1.03	2,741	1,442	0.17
Private				
>5 ha.	0.82	2,673	1,375	0.14
≤5 ha.	0.72	876	1,434	0.62
Ejidos	1.61	3,094	1,620	0.20
<u>Gulf</u>	1.32	5,346	1,109	0.23
Private				
>5 ha.	1.45	6,610	1,615	0.20
≤5 ha.	1.03	2,359	739	1.29
Ejidos	1.22	4,305	608	0.15
<u>North Pacific</u>	0.77	2,325	1,192	0.10
Private				
>5 ha.	0.66	2,525	1,421	0.10
≤5 ha.	0.51	1,053	1,386	0.46
Ejidos	1.00	2,014	753	0.08
<u>South Pacific</u>	1.69	3,675	759	0.34
Private				
>5 ha.	1.74	5,056	703	0.18
≤5 ha.	1.22	841	1,348	1.61
Ejidos	1.78	2,241	681	0.24
<u>Center</u>	1.23	2,441	1,314	0.50
Private				
>5 ha.	1.05	2,364	1,290	0.25
≤5 ha.	0.95	1,609	1,627	2.00
Ejidos	1.53	2,793	1,243	0.31

Source: Calculated from Table 182 in the Appendix and Table 114.

Which is more efficient from an institutional point of view, the larger private farms or the ejidos? An unconditional answer is not obvious and may not be needed. The proportions of inputs, and their qualities, employed by these sectors differ, and they have different objectives. The larger private properties are guided by commercial profit motives; the ejidos are based on a family structure, with institutional rigidities, and their main purpose is to support the inhabitants. Also, the ejidos have not been provided with capital to the same extent that these inputs have been provided for the larger private farms.

CHAPTER VIII
INCOME DISTRIBUTION AND SOCIO-POLITICAL CHANGES

Income Distribution

The structure of personal income distribution in Mexico is greatly influenced by levels of underemployment and unemployment, the distribution of land, and by the distribution of employment, especially between agriculture and the commercial and industrial sectors. There are also wide differences in incomes among geographic regions.

Kuznets, in an attempt to explain the character and causes of long-term changes in the personal distribution of income, conducted a study [Kuznets, 1965a, pp. 257-287] of "...the experience of the new developed countries which grew under the aegis of the business enterprise."¹

¹"...particularly tempting to us - is to favor repetition of past patterns of the now developed countries, patterns that, under the markedly different conditions of the presently underdeveloped countries, are almost bound to put a strain on the existing social and economic institutions and eventuate in revolutionary explosions and authoritarian regimes. There is danger in simple analogies; in arguing that because an unequal income distribution in Western Europe in the past led to accumulation of savings and financing of basic capital formation, the preservation or accentuation of present income inequalities in the underdeveloped countries is necessary to secure the same result....It is dangerous to argue that because they may have proved favorable in the past, completely free markets, lack of penalties implicit in progressive taxation, and the like are indispensable for the

The empirical evidence he analyzed for those countries implied that in the early stages of economic growth inequality in personal income distribution widened, probably as a result of the concentration of savings in the upper income brackets. This increase in savings would have a cumulative effect on the further concentration, in the upper income groups, of the income-yielding assets. The rapid decline in death rates and changes in the production process that tended to substitute capital for labor also had unfavorable effects on the relative economic position of those on the lower end of the income scale. The empirical evidence suggested that later in the process of industrialization, the income inequalities were narrowed in the capitalist developed countries. A decline in birth rates, the relative freedom of individuals to move among areas and among occupations, the widening of the educational base, the increase in importance of the service sector, the political

economic growth of the now underdeveloped countries. Under present conditions the results may be quite the opposite -withdrawal of accumulated assets to relatively "safe" channels, either by flight abroad or into real estate; and the inability of governments to serve as basic agents in the kind of capital formation that is indispensable to economic growth. It is dangerous to argue that, because in the past foreign investment provided capital resources to spark satisfactory economic growth in some of the smaller European countries or in Europe's descendants across the seas, similar effects can be expected today if only the underdeveloped countries can be convinced of the need of a 'favorable climate' [Kuznets, 1965a, p. 284].

decisions to introduce progressive income and inheritance taxes, and other explicit capital levies worked toward a narrowing in the income inequalities.

Williamson conducted a study similar to the one made by Kuznets, but his emphasis was placed on regional inequality in the process of economic growth [Williamson, 1965, pp. 3-45]. Williamson's conclusions were consistent with those drawn by Kuznets. The pattern of change in regional inequality was observed to follow, in a sample of two dozen countries, the pattern of an inverse U in the process of economic growth. A greater inequality in the early stages of growth are expected to be a result of several factors, including an extremely selective inter-regional migration of labor. The migrants may be characterized as the vigorous and entrepreneurial, the educated and skilled, and of productive age; capital moves toward the industries in the growing regions, and if political activity is strong in those growing and passive in the backward ones, the national government may tend to allocate greater percentages of their investment as well as influence the external terms of trade in favor of the growing and politically important region. The forces that could counterbalance those trends in the early stages of growth, such as the spread effects of technical and social changes, and the income multipliers are minimized since interregional linkages may be lacking or inefficient.

Some time, after the early stages in the growth process, some or all of the disequilibrating forces diminish in intensity and a shift towards equality takes place. The migration process is likely to become less selective and costs of migration may be reduced. More efficient national capital markets are developed, external economies and benefits from agglomeration of capital regions may become exhausted or less attractive in the most developed regions; also the national government may become aware of the inequality in the geographic distribution of income and pursue an active policy toward reversing that condition.

General Changes

The income per capita in Mexico has increased continuously since 1930; between 1910 and 1930 it fluctuated as a result of disruptions caused by the Revolutionary War. GNP per capita at constant 1950 prices was more than doubled between 1940 and 1968 (Table 133).

From 1940 to 1968, the average annual rate of growth in GNP (at 1950 prices) was 6.5 percent, while population for the same period increased at a rate of 3.3 percent annually.

A move toward more equality in the distribution of income was one of the objectives of the Mexican Revolution. In a country where the wealth and the main source of income was the land, the agrarian reform with its emphasis on land redistribution was the means selected to obtain a higher

Table 133. GNP, Population, and GNP Per Capita, Mexico 1940-1970

Year	Population (million)	GNP, 1950 Prices	
		Total (mil. pesos)	Per Capita (pesos)
1940	19.8	20,721	1,047
1941	20.2	23,289	1,153
1942	20.7	26,373	1,274
1943	21.2	27,358	1,290
1944	21.7	29,690	1,368
1945	22.2	31,959	1,440
1946	22.8	34,084	1,495
1947	23.4	34,517	1,475
1948	24.1	36,080	1,497
1949	24.8	37,627	1,517
1950	25.8	40,577	1,573
1951	26.6	43,621	1,640
1952	27.4	45,366	1,656
1953	28.2	45,618	1,618
1954	29.1	50,391	1,732
1955	30.0	54,767	1,826
1956	30.9	58,214	1,884
1957	31.9	62,708	1,966
1958	32.9	66,177	2,011
1959	33.9	68,119	2,009
1960	35.5	73,482	2,070
1961	36.7	76,038	2,072
1962	37.9	79,691	2,103
1963	39.1	84,700	2,166
1964	40.4	93,200	2,307
1965	42.1	98,200	2,333
1966	43.9	105,600	2,405
1967	45.5	112,400	2,470
1968	47.3	120,400	2,545
1969	48.9	122,507	2,506
1970	50.6	131,586	2,600

Source: Banco de Mexico, Informe Anual, 1961, 1968 and 1969, (Mexico, D.F.), pp. 59, 51 and 53 respectively; Combined Mexican Working Party, IBRD, The Economic Development of Mexico, (Baltimore: John Hopkins Press, 1953), p. 180; Banco Nacional de Comercio Exterior, Seis Años en el Comercio Exterior de Mexico, (Mexico, D.F.: 1964), p. 48; Nacional Financiera, Informe (Mexico, D.F.: 1964, 1965), pp. 28 and 31 respectively; Business Trends, The Mexican Economy (Mexico, D.F.: 1968), p. 33; USDA, Indices of Agricultural Production for the Western Hemisphere, (April 1971)p.8.

degree of egalitarianism in the Mexican society. While there was an increase in GNP per capita, this increase did not benefit all groups equally. This fact was implicitly recognized by President Diaz Ordaz in his first State of the Union address:

No Mexican can enjoy stable prosperity if it is not shared in some measure by all Mexicans.
...We aspire to a little comfort for many Mexicans, reducing the excess of a few.
[Comercio Exterior, 1965, p. 632].

Several studies have been made of the changes in income distribution over several periods, but these studies differ in scope and methodology.² Reliable data on personal income distribution are not available for periods before 1950. A number of authors indicate a belief that during the Cardenas government a movement toward greater equality of distribution was witnessed as a result of public policies and assistance to labor.

In a study of the 1950 Census, based on the income of employers and employees only, it was concluded that the three upper income groups with 0.11 percent of the gainfully employed persons received over 40 percent of the total income reported³ (Table 134).

²Limitations of these studies include such matters as the presence of certain segments of the population outside the money economy and the difference in habits and needs in different climatic areas.

³In a similar study of the same Census data, it was reported that 86 percent of the population gainfully employed received less than 3,600 pesos annually, and about 43 percent received less than 1,300 pesos.

Table 134. Distribution of Personal Income, Mexico, 1950

Group	Gainfully Employed Persons		Incomes	
	Number, 1,000	Percent	Mill. Pesos	Cumulative Percent
A	1	0.01	12,955	34.26
B	2	0.03	1,127	2.98
C	5	0.07	1,665	4.40
D	10	0.14	1,409	3.73
E	23	0.32	1,555	4.11
F	77	1.06	2,327	6.15
G	150	2.06	2,061	5.45
H	401	5.49	2,713	7.17
I	3,262	44.69	8,987	23.77
J	<u>3,367</u>	<u>46.13</u>	<u>3,017</u>	<u>7.98</u>
Total	7,298	100.0	37,816	100.00

Source: Flores Marquez, Miguel, La Distribucion del Ingreso en Mexico (Mexico, D.F.: Universidad Nacional Autonoma de Mexico, 1958), p. V-9.

A sample survey undertaken in October 1956 by the Direccion General de Estadistica reported that 39 percent of the families residing outside the Federal District had monthly incomes of less than 300 pesos while only 10 percent had monthly incomes over 1,000 pesos [Retchkiman, 1958, p. 228].

A sample study of personal income distribution conducted in 1957 compared with the 1950 Census data showed that income distribution may have become more unequal between 1950 and 1957. Table 135 shows that the income recipients in the two lowest groups experienced absolute declines in their personal income in the period under consideration, while the next three decile groups (III, IV, V) declined in terms of their percentages of total income. The middle (VIII and IX) and lower and middle upper class (Xa and Xb) improved their position absolutely and relatively. In 1950, the upper 20 percent of the families received 60 percent of the total income in Mexico; in 1957 this share had increased to 61 percent. At the same time, the 50 percent of the families with the lower incomes received 19.1 percent in 1950 and only 15.6 percent in 1957. It was reported that in 1963 and 1964, around 40 percent of the Mexican families at the lowest income level received 3.6 percent of the total income while the upper 2 percent of the families received 12 percent of the total income [Fernandez, 1969]. In a study made in 1964-65 it was reported that the upper 20 percent of

Table 135. Distribution of Family Income^a by Deciles, Mexico, 1950, 1957 and 1963

Decile ^b	1950			1957			1963		
	Average Monthly Income, pesos	Percent of Total Income	Cumulative Percentage	Average Monthly Income, pesos	Percent of Total Income	Cumulative Percentage	Percent of Total Income	Cumulative Percentage	
I	247	2.7	2.7	192	1.7	1.7	1	1	1
II	311	3.4	6.1	304	2.7	4.4	2	3	3
III	348	3.8	9.9	350	3.1	7.5	3	6	6
IV	403	4.4	14.3	429	3.8	11.3	4	10	10
V	440	4.8	19.1	485	4.3	15.6	5	15	15
VI	504	5.5	24.6	632	5.6	21.2	6	21	21
VII	641	7.0	31.6	835	7.4	28.6	8	29	29
VIII	788	8.6	40.2	1,128	10.0	38.6	11	40	40
IX	989	10.8	51.0	1,658	14.7	53.3	18	58	58
X	1,621	9.2	60.2	2,233	10.1	63.4	} 42		} 100
(5.2%)	2,858	7.5	67.7	5,460	12.6	76.0			
(2.4%)	12,329	32.3	100.0	11,765	24.0	100.0			

^aIn 1957 prices.

^bPopulation in 10 percent intervals beginning with the lowest income. Decile X includes 10 percent with the highest incomes and has been divided into three groups according to their average monthly income. Income excludes income and property taxes, contributions to social security and union dues.

Source: Navarrete, Ifigenia M. de, La Distribucion del Ingreso Y el Desarrollo Economico de Mexico (Mexico, D.F.: Instituto Mexicano de Investigaciones Economicas, 1960), p. 85; for 1963 data, Prieto Vazquez, Jesus, "La Distribucion del Ingreso en Mexico," Comercio Exterior, Vol. 19, No. 9 (Sept. 1969), p. 691; original source was Banco de Mexico, Encuesta Sobre Ingresos Y Gastos Familiares en Mexico, 1963 (Mexico, D.F.: Banco de Mexico, 1966).

the families received 53 percent of the income, and the lower 50 percent received 20 percent of the income [Secretaria de Industria y Comercio, 1965].

According to data given in Table 136 the main shift in cash family income between 1950 and 1964-65 was a reduction in the share received by the tenth decile (highest 10 percent) and an increase in the ninth decile. In terms of cash income plus income in kind, there appears to have been a reduction in the shares of families in the lower income groups and an increase in shares in the higher income levels (Table 137). A similar shift in the distribution of families in terms of cash income is indicated in Table 138.

The coefficients of variation in regional inequality⁴ of income in agriculture indicates that the inequality increased between 1910 and 1930 (Table 139). However, the war, rather than the development process, probably was the major cause of the change. During that period the Center and the South Pacific regions were affected most adversely. Most of the fighting took place in the states of those two regions.

⁴The idea that transient disturbances may affect the results must be kept in mind since the figures are computed for only individual years that are separated by 10 or 20 years. These disturbances are more likely to occur in the agricultural sector of the underdeveloped countries than in the agricultural sector of the developed countries.

Table 136. Distribution of Cash Family Income by Deciles, Mexico, 1950, 1956, 1958, 1958 and 1964-65^a

Decile	Percent of Income ^b					
	1950 ^c		1956		1958	
	By Group	Cumulative	By Group	Cumulative	By Group	Cumulative
I	2	2	2	2	2	1
II	3	5	2	4	3	3
III	4	9	4	8	4	8
IV	5	14	5	13	5	13
V	5	19	6	19	5	18
VI	6	25	7	26	5	23
VII	7	32	9	35	5	31
VIII	10	42	12	47	8	42
IX	15	57	16	63	11	67
X	42	99	37	100	25	99
Upper 5%	30	-	26	-	30	-
Upper 1%	14	-	8	-	10	-

^aAt 1950 prices.

^bTotals do not necessarily add to 100 due to rounding.

^cExcluding "mixed income," i.e., returns from capital and salaries of self-employed persons.

Source: Prieto Vazquez, Jesus, "La Distribucion del Ingreso en Mexico," Comercio Exterior, Vol. 19, No. 9, (Sept. 1969), p. 692.

Table 137. Distribution of Families According to Real Family Income, Mexico, 1950, 1957 and 1963

Monthly Family Income ^a (pesos)	Percent of Families ^b					
	1950		1957		1963 ^c	
	By Group	Cumulative	By Group	Cumulative	By Group	Cumulative
75 or Less	4	4	9	9	5	5
76-150	26	30	21	30	18	23
151-200	19	49	12	42	10	33
201-300	17	66	18	60	16	49
301-400	11	77	13	73	12	61
401-599	11	88	12	85	12	73
601-1,000	7	95	8	93	13	86
1,001-1,500	2	97	4	97	6	92
1,501 or more	2	99	3	100	8	100
1,501-3,000	{1}	-	d	-	{6}	-
3,000 or more	{1}	-	d	-	{2}	-

^aAt 1950 prices, includes goods produced and consumed by producers' families and income received in kind in addition to cash income.

^bTotals do not necessarily add to 100 due to rounding.

^cExcluding income and property taxes, contribution to social security and union dues.

^dData not available.

Source: Prieto Vazquez, Jesus. "La Distribucion del Ingreso en Mexico," Comercio Exterior, Vol. 19, No. 9 (Sept. 1969), p. 693; original sources: Navarrete, Ifigenia M. de, La Distribucion del Ingreso y el Desarrollo Economico de Mexico D.F.: Instituto Mexicano de Investigaciones Economicas, (1960) and Banco de Mexico, Encuesta sobre Ingresos y Gastos Familiares en Mexico, 1963 (Mexico, D.F.: Banco de Mexico, 1966).

Table 138. Distribution of Families According to Cash Family Income, Mexico, 1950, 1956, 1958, and 1964-65

Monthly Family ^a Income	Percent of Families ^b					
	1950 ^c		1956		1958	
	By Group	Cumulative	By Group	Cumulative	By Group	Cumulative
(pesos)						
Less than 75	4	4	8	8	5	11
76-149	29	33	20	28	17	13
150-199	22	55	14	42	12	24
200-299	16	71	15	57	21	36
300-399	10	81	12	69	14	55
400-499	6	87	9	78	10	69
500-599	3	90	6	84	4	79
600-799	5	95	4	88	5	83
800-999	2	97	4	92	5	89
1,000-1,499	2	99	5	97	4	92
1,500-2,999	1	100	3	100	3	96
3,000 or more	d	100				
					100	99
					100	101

^aIn 1950 prices.

^bTotals do not necessarily add to 100 due to rounding.

^cExcluding "mixed income," i.e., returns from capital and salaries of self-employed persons.

^dLess than 0.5 percent.

Source: Prieto Vazquez, Jesus, "La Distribucion del Ingreso en Mexico," Comercio Exterior, Vol. 19, No. 9 (Sept. 1969), p. 691.

Table 139. Coefficient of Variation^a in Regional Income, Mexico, 1900-1960

Year	Coefficient of Variation
	(V)
1900	0.39
1910	0.38
1930	0.51
1940	0.31
1950	0.48
1960	0.48

^aThe coefficient of variation is computed in the following way:

$$V = \frac{\sqrt{\sum_1 (Y_i - \bar{Y})^2 \frac{R_i}{P}}}{\bar{Y}}$$

where Y_i = agricultural production per rural inhabitant in the i^{th} region.

\bar{Y} = national average of agricultural production per rural inhabitant.

R_i = rural population in the i^{th} region.

P = total rural population of Mexico.

Source: For data, see Tables 185 and 186 in the Appendix. For methodology, see Williamson, Jeffrey G., "Regional Inequality and the Process of Development," Economic Development and Cultural Change, Vol. XIII, No. 4, part II (July 1965), p. 11.

Zapata's "land and liberty" movement was developed in those regions, and it was there where the strongest pressure for land reforms arose. The North and the North Pacific, mostly isolated from the effects of the war, provided most of the new government leaders and these regions benefited most from the public programs immediately following the war.

The coefficient of variation was lower in 1940. This reduction may be the result of the programs initiated during the administration of Cardenas. These programs included an acceleration in the redistribution of land, mainly in the Center and in the Northern region, a credit program that created the BNCE which benefited the regions with the most ejidos. A general recovery from the disruptions of the war probably was a factor, also. The increase in the coefficient of variation between 1940 and 1950 was probably due to the greater percentage of public investments in irrigation, dams and roads in the North and North Pacific regions, the implementation of credit programs for cash crops concentrated in those regions, and the policy of the BNCE that provided most of its credit to the ejidos in the North and North Pacific. The ejidos in the North and North Pacific regions were, in many instances, collective and highly capitalized. In the Center, on the other hand, the ejidos, predominantly, were operated as small individual lots, lacked credit and cultivated traditional food crops. The region was overpopulated and the soils have become increasingly eroded as a result of

primitive methods of cultivation that have existed since pre-Colombian days.

Functional Distribution

With reference to functional distribution of income, using data from the Nacional Financiera, Navarro estimated that labor's share in national income decreased between 1940 and 1950, the years of intensive industrialization efforts and a strong inflationary pressure (Table 140). However, the changes in the distribution of income appear to have moved in a cyclical manner rather than having a definite secular trend.

Aubrey reported that profit, rent and interest rose from 34.3 percent of national income in 1939 to 52.6 percent in 1952, while the shares of other factors declined [Aubrey, 1954, p. 522]. Similarly, the United Nation's Economic Commission for Latin America (ECLA) noted that from 1945 to 1953 wages and other labor earnings declined from 52 percent to 49 percent⁵ [U.N. ECLA, 1954, p. 19]. Reasons given for these changes were the increases in demand for commodities and consequently rising prices.

Non-agricultural entrepreneurs accounted for only 13 percent of the persons with paid activities but received

⁵The percentages in Aubrey and ECLA differ from the ones in Navarro's work due to differences in concept, and the use of the mixed income category by Navarro.

Table 140. Distribution of National Income Between Labor and Capital, Mexico, 1940, 1950 to 1960, and 1966

Year	Labor ^a	Capital ^b	Mixed ^c	Total
	-----percent-----			
1940	29.1	43.9	27.0	100.0
1950	23.8	47.4	28.8	100.0
1951	22.4	48.3	29.3	100.0
1952	22.3	48.3	29.4	100.0
1953	25.5	46.5	28.0	100.0
1954	28.5	44.5	27.0	100.0
1955	26.4	45.8	27.8	100.0
1956	25.9	46.1	28.0	100.0
1957	27.8	44.9	27.3	100.0
1958	29.9	43.6	26.5	100.0
1959	30.8	43.0	26.2	100.0
1960	31.4	42.6	26.0	100.0
1966	<u>26.2</u>	<u>48.0</u>	<u>25.8</u>	<u>100.0</u>
Average 1950-60	26.8	45.5	27.7	100.0

^aLabor includes wages, salaries and supplements.

^bCapital includes profits, imputed earnings of self-employed, rent and interest.

^cMixed incomes include mostly agricultural earnings but also some profits.

Source: Delgado Navarro, Juan, Desarrollo Economico y Justicia Social en Mexico (Mexico, D.F.: Universidad Nacional Autonoma de Mexico, 1961), pp. 160, 220, 256; "Los Salarios y el Desarrollo Economico" Revista de Economia, Vol. 26 (December, 1963), pp. 343-350. Aguilera Gomez, Manuel, La Reforma Agraria en el Desarrollo Economico de Mexico (Mexico, D.F.: Instituto Mexicano de Investigaciones Economicas, 1969), p. 217.

almost 50 percent of the National Income in 1960. Their real income at 1950 prices increased 94 percent between 1940 and 1950 [Vargas Torres, 1965, p. 243].

While salaries in current pesos increased over six times from 1940 to 1960, and despite substantial increases in labor productivity, the cost of living index more than off-set the increases in salaries even though the rate of inflation between 1950 and 1960 slowed down (Table 141).

Agriculture vs. Other Sectors

With reference to the intersectoral distribution of income in 1950, the commercial sector received 30.9 percent of the National Income, but employed only 8.3 percent of the labor force (Table 142). The agricultural sector, on the other hand, employed 58.3 percent of the labor force, produced 22.5 percent of the GNP, and received only 19.6 percent of the National Income. These results may be a consequence of the fact that a significant part of agriculture failed to participate in modernization and growth, despite the relatively high average growth rate in agriculture.

In 1960, the situation in the agricultural sector had changed very little. It produced 18.9 percent of the GNP and employed 54.2 percent of the labor force. Manufacturing produced 23.0 percent of the GNP and employed 13.7 percent of the labor force [Nacional Financiera, 1965].

Table 141. Indexes of Labor Productivity, Cost of Living, and Salaries, Mexico, 1940^a

Year	Index			
	Productivity	Cost of Living	Salaries	
			Current	Real
1940	100.0	100.0	100.0	100.0
1950	138.3	353.7	304.3	86.0
1960	185.8	724.6	658.0	90.8

^a1940=100.0 .

Source: Comision Nacional de Salarios Minimos, Revista de Economia, Vol. XXVI, No. 12 (December, 1963), p. 349.

Table 142. Distribution of National Income and Labor Force by Economic Sector, Mexico, 1950

Activity	National Income	Labor Force
	-----percent-----	
Commerce	30.9	8.3
Transportation	4.3	2.5
Industry	25.1	15.9
Miscellaneous	6.0	4.4
Services, Including Government	14.1	10.6
Agriculture	<u>19.6</u>	<u>58.3</u>
	100.0	100.0

Source: Vidal, Rodrigo V. "La Estructura del Ingreso en su Composicion de Consumo y Ahorro" in UNAM, La Intervencion del Estado en la Economia (Mexico, D.F.: Universidad Nacional Autonoma de Mexico, 1955), p. 133.

From 1928 to 1962 the value of Gross National Product per economically active person in agriculture was substantially less than it was in other activities (Table 143). While this figure in agriculture increased slightly as a percentage of the value in other activities, the absolute difference was widened considerably, with the gain in other activities exceeding that in agriculture by 1,568 pesos between 1948-52 and 1958-62. Another source shows a rapid increase in value of output per person employed in industry and in commerce in relation to agriculture between 1900 and 1921; subsequently these ratios declined but not to the level that existed in 1900 (Table 144). The period around 1921 included the years in which agricultural production was disrupted by the Revolutionary War. From 1935 to 1967 these ratios were relatively stable--an indication that value of output per worker in agriculture was moving in step with that in industry and commerce although the actual differences remained rather high. A Nacional Financiera report shows a continuously widening difference between value of output per worker in agriculture and in all sectors, but the ratio has fluctuated since 1930 (Table 145).

In 1955, according to Mujia Montoya, the per capita income of agricultural workers was 2,690 pesos whereas the average income for all economically active persons was 7,330 pesos, (2.7 times the agricultural rate) and for those engaged in non-agricultural activities, the amount was 12,834

Table 143. Average Annual Gross Product^a Per Economically Active Person, Mexico, Selected Periods 1928-1962

Item	Period			
	1928-32	1938-42	1948-52	1958-62
	pesos			
<u>Product per Worker</u>				
All Workers, pesos	3,007	3,705	4,885	6,536
Agriculture, pesos	701	832	1,207	1,584
Other, pesos	8,036	8,688	9,678	12,000
Other-Agric. Difference, pesos	7,335	7,856	8,471	10,416
Agriculture as Percent of Other	8.7	9.6	12.5	13.2
<u>Increase With Respect To Preceding Period</u>				
All Workers, pesos	-	698	1,180	1,651
Agriculture, pesos	-	131	375	377
Other, pesos	-	652	990	1,945
Other-Agric. Difference, pesos	-	521	615	1,568
Agriculture as Percent of Other	-	20.1	37.9	19.4

^aIn constant 1950 pesos.

Source: Vargas Torres, E., "El Producto y la Productividad Agrícola," El Trimestre Económico, Vol. 21, No. 2 (April-June 1965), p. 258.

Table 144. Value of Output per Person Employed in Industry and Commerce in Relation to Agriculture, Mexico, Selected Years from 1900 to 1967

Year	Ratios	
	Industry/Agriculture	Commerce/Agriculture
1900	2.6	2.6
1910	3.3	3.2
1921	10.9	8.2
1930	6.3	8.4
1935	5.1	5.8
1940	6.8	6.3
1950	4.9	4.7
1960	5.0	5.1
1967	4.8	5.0

Source: Solis, Leopoldo M., La Realidad Economica Mexicana, (Mexico, D.F.: Editores Siglo XXI, 1970), p. 291.

Table 145. Value of Output Per Worker^a, Agriculture and All Sectors, Mexico, Selected Years between 1910 and 1964

Year	Value per Worker		Comparison	
	Agriculture (1)	All Sectors (2)	Difference (2-1)	Agriculture As % of All
	pesos			(percent)
1910	1,279	2,757	1,478	46.4
1921	1,318	3,152	1,834	41.8
1930	1,076	3,154	2,078	34.1
1940	1,410	3,732	2,322	37.8
1950	1,907	4,969	3,062	38.4
1960	2,279	6,557	4,278	34.8
1964	2,388	7,158	4,770	33.4

^aFrom 1910 to 1940, GNP, from 1950 to 1964, Gross Domestic Product; in 1950 pesos.

Source: Nacional Financiera, S.A., La Economía Mexicana en Cifras, (Mexico, D.F.: Nacional Financiera, S.A., 1965), p. 37.

pesos (4.8 times the agricultural rate) [Mujia Montoya, 1956, p. 566]. According to a study by Isbister, the average value of monthly output per worker in 1950 was 160 pesos in the agricultural sector, while in the industrial sector the average level of unskilled worker earnings was 175 pesos. In 1960, the average value of monthly output per agricultural worker was 353 pesos, and the average unskilled industrial worker was receiving 427 pesos [Isbister, 1967].

Based on the Population Census of 1960, the average yearly income was calculated to be 4,272 pesos for agricultural workers and 9,600 pesos for non-agricultural workers. The relationship was also more than 2 to 1 in favor of non-agricultural families when measured in terms of income per family in 1963 [Banco de Mexico, 1966, pp. 178 ff.].

A cross-section view within the urban sector shows that average monthly income per person increased among urban centers as the number of inhabitants increased. In 1963, the average monthly income per capita varied from 126 pesos in the towns with less than 2,500 inhabitants to 484 pesos per capita in cities with more than half a million persons (Table 146).

Within the rural sector there was a wide variation in the personal distribution of income. In 1963 the average income per family in the agricultural sector was 9,600 pesos, but 29 percent of the families received less than 3,600 pesos, 35 percent between 3,602 and 7,200 pesos, and only 19 percent

Table 146. Average Monthly Income Per Person, by Size of City, Mexico, 1963

Inhabitants	Income
(number)	(pesos)
2,500 or less	126
2,501-10,000	183
10,000-150,000	252
150,001-500,000	328
500,001 and over	484
D.F.	454
Mexico	222

Source: Banco de Mexico, Encuesta sobre Ingresos y Gastos Familiares en Mexico, 1963 (Mexico, D.F., Banco de Mexico, 1966), pp. 243-245.

received over 12,000 pesos. Within the agricultural sector, there were 1.5 million families of day-laborers and a third of them received less than 300 pesos monthly [Banco de Mexico, 1966, pp. 150-163].

Although the minimum wage index in current pesos increased continuously, from 75.7 in 1934-35 to 856.6 in 1962-63, the index fluctuated widely when adjusted for price changes (Table 147). The real minimum wage index in the Cardenas years (1934-40) was about equal to the index values of the base period of 1940-41. The emphasis on development through the encouragement of private initiative by way of profits and the inflationary process in the 1940's depressed the real minimum wage to about 25 percent below the base period.

The difference between minimum wages in the rural and urban sectors has increased over time—from only 6 centavos in the early days of Cardenas to 2.53 pesos in the 1964-65 period (Table 148). In terms of a percentage of urban wages, the rural wage rate dropped to a low point in 1950-51 and subsequently increased but not to the 1934-35 level. One source indicated that purchasing power per worker decreased by 7 percent in the industrial sector, and by 46 percent for agricultural workers between 1939 and 1949 [Lopez Rosado and Noyola Vazquez, 1951, pp. 201-204]. From 1952-53 to 1960-61 it varied closely around the 100 level and increased sharply in 1962-63. These were the years in which President Lopez

Table 147. Urban Minimum Wage Index, Mexico, by Two-Year Periods 1934-35 to 1962-63

2-Year Period	Minimum Wage Index ^a		Wholesale Price Index, Mexico City ^a
	In Current Prices	In Constant 1940-41 Prices	
1934-35	75.7	109.1	69.4
1936-37	86.2	98.6	87.4
1938-39	96.1	102.7	93.6
1940-41	100.0	100.0	100.0
1942-43	100.0	75.4	132.6
1944-45	125.0	66.9	186.9
1946-47	163.2	73.1	223.3
1948-49	198.0	78.9	251.0
1950-51	220.4	65.6	336.2
1952-53	352.0	104.5	337.0
1954-55	466.0	99.5	468.5
1956-57	517.1	98.0	527.8
1958-59	538.8	96.2	560.0
1960-61	619.1	103.7	597.2
1962-63	856.6	138.9	616.9

^a1940-41=100.

Source: Wilkie, James W. The Mexican Revolution: Federal Expenditure and Social Change Since 1910 (Berkeley: University of California Press, 1967), p. 187.

Table 148. Average Minimum Daily Wage, Urban and Rural Areas, Mexico, by Two-year periods from 1934-35 to 1964-65

2-Year Period	Urban	Rural	Urban Minus Rural	Rural as % of Urban
	-----current pesos-----			(percent)
1934-35	1.15	1.09	.06	94.8
1936-37	1.31	1.21	.10	92.4
1938-39	1.46	1.31	.15	89.7
1940-41	1.52	1.30	.22	85.5
1942-43	1.52	1.35	.17	88.8
1944-45	1.90	1.65	.25	86.8
1946-47	2.48	2.05	.43	82.7
1948-49	3.01	2.40	.61	79.7
1950-51	3.35	2.66	.69	79.4
1952-53	5.35	4.55	.80	85.0
1954-55	6.34	5.26	1.08	83.0
1956-57	7.25	5.99	1.26	82.6
1958-59	8.13	6.86	1.27	84.4
1960-61	9.89	8.17	1.72	82.6
1962-63	12.44	10.97	1.47	88.2
1964-65	16.00	13.47	2.53	84.2

Source: Nacional Financiera, S.A. La Economía Mexicana en Cifras, (Mexico, D.F.: Nacional Financiera, S.A., 1965), p. 167.

Mateos showed increasing concern for the well being of the Mexican labor force. The reasons for these increasing differences between sectors can be found in the stronger unions in the industrial sector, as well as in the greater population pressures and lower cost of living in the rural sector. The differences may also be a result of more rapid increases in productivity per man in the industrial sector.⁶

The existence of legal minimum wage rates does not mean that they are widely implemented throughout the country. In 1964, it was reported that almost 40 percent of the Mexican workers were receiving less than the minimum wage [Cano, 1965, p. 634]. Since the violations are to be reported by a union or a worker, this low level of compliance indicates a weakness or absence of labor unions, especially in the rural areas.

In the rural sector, one would expect the income distribution pattern to be closely associated with the land ownership distribution. Unfortunately, the data on land holdings, as given in Table 149, do not represent the ownership pattern as each ejido is classified as a single unit and thus appears in the large holdings. For this reason, the large difference between the rural income distribution and

⁶Minimum daily wage rates from 1933 to 1963 were set biennially at the county level; but since 1964 they have been set at the national level allowing for differences in zones.

Table 149. Distribution of Agricultural Land, Rural Income and Personal Cash Income in the Form of Observations of Points on the Lorenz Curve, Mexico, 1960

Number of Holdings	Land Area	Number Rural Families	vs. Rural Income	Number Persons	vs. Cash Income	Personal Cash Income
			--cumulative percentage--			
65.7	0.8	-	-	10.0		2.0
72.7	1.2	29.0	8.5	20.0		4.0
82.4	2.4	61.4	27.4	30.0		6.0
87.5	3.9	83.8	50.5	40.0		12.0
91.8	6.4	89.4	59.9	50.0		20.0
94.9	9.9	97.3	82.2	60.0		27.0
97.1	15.5	99.0	90.9	70.0		35.0
98.2	21.7	99.7	95.6	80.0		47.0
99.4	45.3	99.9	97.9	90.0		64.0
100.0	100.0	100.0	100.0	100.0		100.0

Sources: IV Censo Agricola, Canadero y Ejidal; Mazumdar, Dipak, An International Comparison of Low Income in the Agricultural Sector in Selected LDC's, Economic Staff Working Paper No. 118 (Washington, D.C.: International Bank for Reconstruction and Development, Oct. 1971), Appendix II, Section B, p. 3; Prieto Vazquez, Jesus, "La Distribucion del Ingreso en Mexico," Comercio Exterior, Vol. 19, No. 9 (Sept. 1969), p. 691.

the land distribution might be expected. The distribution of rural income appears to differ very little from the distribution pattern for personal cash income on the basis of the observed points on the Lorenz curve.

Based on salaried and self-employed workers, the distribution of families in agriculture in comparison with the total is more highly skewed toward the low income levels, as was expected (Table 150). The distribution patterns, based on cash income plus income in kind, also show the distribution in agriculture more highly skewed toward the lower income levels (Table 151).

Differences Among Geographic Areas

The differences in income among types of land holding within regions and states were discussed earlier (See Table 86). Differences among areas are quite wide. In 1958 the Banco Nacional de Credito Ejidal (BNCE) reported that the average annual income per ejidatario in the northern area was 4,199 pesos while in the state of Baja California del Norte, a state within this area, it was 27,335 pesos. In the southeastern and southern areas, the average incomes per ejidatario were 2,592 and 2,014 pesos, respectively. In the Center region the average ejidatario income was only 1,827 pesos and in the state of Zacatecas, the annual income per ejidatario was only 346 pesos [Moreno Sanchez, 1960, p. 102]. Studies made in 1956 reported that while the average

Table 150. Distribution of the Economically Active Population^a, Total and Agriculture, According to Monthly Income, Mexico, 1964-65

Monthly Income (pesos)	Total		Agriculture	
	By Income Groups	Cumulative	By Income Group	Cumulative
	-----percent-----			
Up to 299	34.1	34.1	49.1	49.1
300-749	41.1	75.2	41.2	90.3
750-999	8.7	83.9	3.9	94.2
1,000-1,500	9.4	93.7	3.5	97.7
1,501-2,000	2.5	95.8	0.9	98.6
2,001-3,000	2.0	97.8	0.8	99.4
3,001-5,000	1.2	99.0	0.4	99.8
5,001-10,000	0.7	99.7	0.1	99.9
10,001 and over	0.3	100.0	b	100.0

^aSalaried and self-employed workers.

^bLess than 0.5 percent.

Source: Prieto Vazquez, Jesus, "La Distribucion del Ingreso en Mexico," Comercio Exterior, Vol. 19, No. 9 (Sept. 1969), p. 695.

Table 151. Distribution of Families According to Monthly Income by Sectors of Activity of the Heads of Families, Mexico 1963

Monthly Income	Sector of Activity of Head of Family ^b					
	Total Families		Agriculture		Manufacture	
	By Group	Cumulative	By Group	Cumulative	By Group	Cumulative
(pesos)	percent					
Up to 175	4.7	4.7	7.9	7.9	1.8	1.8
176-225	4.6	9.3	7.8	15.7	0.8	2.6
226-300	9.1	18.4	13.2	28.9	1.3	3.9
301-400	10.8	29.2	17.5	46.4	5.1	9.0
401-530	9.0	38.2	11.7	58.1	7.9	16.9
531-700	12.3	50.5	11.0	69.1	14.6	31.5
701-950	12.5	63.0	11.0	80.1	17.2	48.7
951-1,250	8.2	71.2	5.0	85.1	12.6	61.3
1,251-1,700	8.3	79.5	3.2	88.3	14.0	75.3
1,701-2,200	6.1	85.6	4.3	92.6	6.4	81.7
2,201-3,000	5.4	91.0	3.5	96.1	5.9	87.6
3,001-4,000	3.3	94.3	1.6	97.7	4.6	92.2
4,001-5,200	2.2	96.5	1.0	98.7	3.8	96.0
5,201-7,000	1.7	98.2	0.9	99.6	1.2	97.2
7,001-9,200	0.6	98.8	0.1	99.7	0.6	97.8
9,201 and over	1.2	100.0	0.5	100.2	2.0	99.8

Table 151. Continued.

Monthly Income ^a	Sector of Activity of Head of Family ^b			
	Commerce		Services	
	By Group	Cumulative	By Group	Cumulative
(pesos)	percent			
Up to 175	4.4	4.4	2.6	2.6
176-225	1.4	5.8	3.7	6.3
226-300	6.0	11.8	7.5	13.8
301-400	5.6	17.4	6.5	20.3
401-530	10.5	27.9	4.4	24.7
531-700	11.2	39.1	12.0	36.7
701-950	10.2	49.3	12.4	49.1
951-1,250	11.7	61.0	8.0	57.1
1,251-1,700	10.6	71.6	11.8	68.9
1,701-2,200	6.1	77.7	8.7	77.6
2,201-3,000	8.9	86.6	7.1	84.7
3,001-4,000	4.5	91.1	5.6	90.3
4,001-5,200	2.5	93.6	3.7	94.0
5,201-7,000	3.8	97.4	2.7	96.7
7,001-9,200	0.5	97.9	1.7	98.4
9,201 and over	2.0	99.9	1.8	100.2

^aIncludes money income plus income in kind produced or received by the family unit, but excludes income and property taxes, contributions to social security and union dues.

^bTotals do not necessarily add to 100 due to rounding.

Source: Prieto Vasquez, Jesus "La Distribucion del Ingreso en Mexico," Comercio Exterior, Vol. 19, No. 9 (Sept. 1969), p. 694.

monthly income per family for Mexico was 693 pesos per month, the incomes in several regions were above the national average, in the Federal District and the North Pacific region in particular. The North Pacific is characterized by extensive irrigation projects and its relatively modernized agricultural sector. Income in the Gulf and North regions were close to the national average. On the other hand, average monthly incomes in the Center and the South Pacific regions, characterized by relatively dense population and traditional agriculture, were substantially below the national average (464 and 447 pesos, respectively) [Navarrete, 1960, p. 72].

As a reflection of the uneven distribution of income between the irrigated districts and the non-irrigated districts in the agricultural sector, a survey reported that a much higher percentage of the farmers in the irrigated districts, compared with non-irrigated districts, owned their houses, tractors and durable appliances (Table 152).

The situation was similar in terms of average minimum daily money wages in agriculture. In 1948 and 1949 these were 3.93 pesos in the North Pacific, 2.80 pesos in the Gulf region and 2.35 pesos in the North, and 2.24 and 2.21 pesos, respectively, in the Center and South Pacific regions [Lopez Rosado and Noyola Vazquez, 1951, p. 201]. A study of the distribution of income among families, made by the Secretariat of Industry and Commerce in 1957, also showed that income

Table 152. Percentage of Farmers Owning Selected Items,
Inside and Outside the Irrigation Districts,
Mexico, 1958

Item	Inside	Outside
	percent	
House	95	25
Tractors and Equipment	40	5
Various Vehicles	48	10
Gas Kitchen	75	15
Refrigerator	20	1
Electric Washers	5	1
Radio	95	30
Television	5	1

Source: Oribe Alba, Alfonso "Las Obras de Irrigacion,"
in Mexico: 50 Anos de Revolucion, Vol. 1. La
Economia (Mexico, D.F.: FCE), p. 379.

distribution differed widely between urban and rural sectors and among regions (Table 153).

There was a more skewed distribution of income in the rural sector in comparison with the urban sector. In Aguascalientes the urban monthly family income averaged 558 pesos; and 32.3 percent received less than 300 pesos and 83.1 percent received less than the national mean. In the rural sector of the state the monthly family income averaged 343 pesos and 95.2 percent of the families received less than the national average.

Those states with higher incomes per family were the states with higher productivities (in terms of value of agricultural output per worker)--Baja California del Norte, Sonora and the Federal District. The states with the highest percentages of their families below the national average income, and with average state incomes below the national level are the states with the lowest productivities (Table 154).

In another study conducted in the state of Guanajuato, the results gave further support to the skewness in the income distribution in Mexico--56 percent of the families received less than 300 pesos monthly, 29 percent received between 300 and 700 pesos, and only 15 percent received over 700 pesos [Fernandez Bravo, 1963, p. 45].

In a study of the ejidos in San Luis Potosi, it was reported that the average family income of the ejidatarios,

Table 153. Distribution of Number of Families by Level of Income, Urban and Rural Sectors, Selected States in Mexico, 1958

State and Sector	Income Per Month In Pesos										% Below National Mean
	300 and Less	301 to 500	501 to 750	751 to 1,000	1,001 to 2,000	2,001 to 3,000	3,001 or more	percent			
Mean Income	(pesos)										
Baja Calif. N.											
Urban	2,066	a	1.4	6.7	12.0	44.2	22.6	13.0		11.7	
Rural	1,775	a	a	24.9	23.0	31.5	9.3	11.3		31.8	
Sonora											
Urban	1,361	a	9.2	14.4	23.7	39.5	5.9	7.2		30.7	
Rural	1,100	6.1	16.6	19.0	15.8	32.8	6.9	2.8		46.4	
Chihuahua	1,365	7.2	24.3	13.6	14.0	26.7	8.7	5.5		54.3	
Federal District	1,449	6.9	16.3	13.4	17.2	29.0	8.0	9.2		46.8	
Aguascalientes											
Urban	558	32.3	34.6	13.9	7.9	9.4	1.9	b		83.1	
Rural	343	58.2	22.9	12.9	4.3	1.1	0.7	b		95.2	
Hidalgo											
Urban	847	8.8	20.5	22.2	23.2	20.8	4.4	b		58.6	
Rural	386	47.2	29.8	19.9	2.8	0.4	b	b		97.6	
Oaxaca											
Urban	682	27.7	30.2	20.6	6.8	9.3	3.2	2.1		80.4	
Rural	475	40.9	22.7	19.4	10.1	6.8	b	b		86.1	
Mexico	825	a	47.5	19.7	12.6	14.0	3.5	2.7		71.0	

^aIncluded in subsequent columns.

^bIncluded in preceding columns.

Source: Secretaría de Industria y Comercio, Ingresos y Egresos de la Población de México (Mexico, D.F.: 1960).

Table 154. Value of Agricultural Output Per Worker Employed in Agriculture, by High and Low Production Areas, Mexico, 1960

High Production Areas		Low Production Areas	
State	Pesos	State	Pesos
Baja Calif., North	33,800	Tlaxcala	1,940
Sonora	19,600	Oaxaca	1,970
Federal District	18,850	Puebla	2,320
Tamaulipas	12,450	Queretaro	2,380
Baja Calif., South	12,100	Zacatecas	2,440
Sinaloa	8,300	Mexico	2,480
Coahuila	8,050	San Luis Potosi	2,510
Chihuahua	7,800	Hidalgo	2,520
Nayarit	7,750	Guanajuato	2,980

Source: Lamartine Yates, Paul, El Desarrollo Regional de Mexico, (Mexico, D.F.: Banco de Mexico, 1961), p. 54.

who were located near the capital, was 302 pesos monthly, and 62 percent of the families received incomes below this level [Aleman Aleman, 1966, p. 175]. The economic situation of the agricultural workers, the rural majority, was described by a Mexican economist, Moises T. de la Pena, as follows for 1962: with an average rural salary of eight pesos per day, and 200 days of work annually as an optimistic average in view of the lack of work opportunities, whoever has only the resources of his two arms receives 1,600 pesos yearly. When this is distributed among five persons of the family, it amounts to 320 pesos or US\$25.60 per capita. This amount is augmented by the income that may be obtained by some family member and from other sources, which is never lacking, otherwise it would be impossible to subsist. In total, the poorest people may receive approximately US\$35 yearly per person. Direct observations within the rural population indicate that 75 percent of this population receives less than US\$60 annually per person [De la Pena, 1964, p. 199].

The redistribution of land, over 82 million hectares from 1915 to 1970, has been considered by some persons as a redistribution of income. No estimate of the value of these lands is available, but it should be kept in mind that this is a redistribution of wealth, not income. Redistributed wealth, with its proper use and with other associated factors, may increase income, but in the absence of complementary

factors it may also contribute to the reduction of income of the recipient of land. Although one of the purposes of the redistribution of land was to raise the income of the ejidatarios, a high level of inequality of income distribution is still present.

Employment

Undoubtedly there is considerable underemployment and possibly unemployment in the agricultural sector of Mexico but available data do not permit any exact measurements of the amounts. The net supply of labor is related to the high rates of growth in population and the transfer to non-farm sectors. The demand for labor in agriculture is determined by the subsistence requirements, the market demand for farm output, the supply of complementary inputs and the supply of inputs that substitute for labor.

Mexico's population at the beginning of the century was estimated to be 13.6 million and by 1970 it had increased to over 50 million (Tables 133 and 155). Population has increased continuously with the exception of the period between 1910 and 1921. The decline in population occurred during the years of intense fighting in the Revolution and in the influenza epidemic of 1918-19. The annual growth rate during the decade ending in 1970 varied between 3.2 percent and 4.2 percent and averaged 3.6 percent (based on data in Table 133). Rapid growth in population not only adds workers to the labor supply but also increases the

Table 155. Population and Labor Force: Total, Urban and Rural, Mexico, Census Years 1900-1964

Year	Population ^a				Percent		Labor Force		Total			
	Total	Urban	Rural	Urban	Of Population	In Agric.	Non-Agric.	Agric.				
										Number	Percent	Number
-----million-----				(percent)		-----percent-----		-----1,000-----				
1900	13.6	2.6	11.0	19.4	33.6	69.5	1,394	3,177	4,571			
1910	15.2	3.6	11.5	24.2	35.2	67.5	1,736	3,596	5,332			
1921	14.3	4.5	9.9	31.2	35.2	69.2	1,555	3,490	5,045			
1930	16.6	5.5	11.0	33.5	32.4	67.7	1,732	3,626	5,358			
1940	19.7	6.9	12.8	35.1	30.8	63.3	2,224	3,831	6,055			
1950	25.8	11.0	14.8	42.6	32.1	58.3	3,448	4,824	8,272			
1960	34.9	17.7	17.2	50.7	32.4	54.2	5,188	6,144	11,332			
1964	39.6	20.9	18.8	52.6	32.7	52.3	6,307	6,909	13,216			

^aUrban population in the 1921 Census was based on towns of 2,000 inhabitants or more; in the other years, it was based on towns of 2,500 inhabitants or more.

Source: Nacional Financiera, S.A., La Economía Mexicana en Cifras, (Mexico, D.F.: Nacional Financiera, S.A., 1965).

number of dependents per worker and the "need" for social services. The number of dependents per worker increased from 1.98 in 1900 to 2.25 in 1940; subsequently there has been a small decline (Table 156). Population increases resulted from a combination of increases in the birth rates and dramatic decreases in the mortality rates. The birth rate in Mexico, estimated to be 34.2 in 1901, experienced a substantial increase, up to 44.2 per 1,000 inhabitants in 1965 (Table 157). Apparently the population growth rate must decrease at some time in the future as the increases in birth rate appear to have ceased and there is a limit to the potential reductions in death rate.

The decrease in the mortality rates has been due primarily to the diffusion of public health services, both preventive and healing. Many of the former epidemic illnesses have been practically eradicated. Associated with the reduction of the mortality rates due to medical improvements in public health have been the increase in the life expectancy at birth: 27.4 years in 1910 to about 60 years in 1960.

In the developed countries of today, the reduction of the mortality rates was associated with the increases in the levels of living and with decreases in the birth rate. That is not the case in the underdeveloped world [Myrdal, 1965, p. 253], and Mexico is an example. High levels of illiteracy have also been a handicap in the implementation

Table 156. Ratios of Population to Labor Force, Mexico,
Census Years 1900 to 1964

Year	Total Population/ Total Labor Force	Urban Population/ Non-Agricultural Labor Force	Rural Population/ Agric. Labor Force
1900	2.98	1.87	3.46
1910	2.85	2.07	3.20
1921	2.83	2.89	2.84
1930	3.10	1.52	3.03
1940	3.25	3.10	3.34
1950	3.12	3.19	3.07
1960	3.08	3.41	2.80
1964	3.00	3.31	2.72

Source: Calculated from data in Table 155.

Table 157. Rates of Birth, Death and Population Growth, Mexico, 1901-1965

Year	Births	Mortality	Natural Increase	Infant Mortality
	-----per 1,000 inhabitants-----			(per 1,000 liveborn)
1901	34.2	32.3	2.1	266.4
1909	34.0	32.3	1.7	294.3
1923	32.0	24.4	7.6	222.4
1931	43.8	25.9	18.0	137.7
1941	43.5	22.1	21.4	123.0
1951	44.6	17.3	27.3	98.8
1960	44.6	11.2	33.4	74.2
1965	44.2	9.5	34.7	60.7

Source: Cumberland, Charles C. Mexico: the Struggle for Modernity, (New York: Oxford University Press, 1968), p. 366.

of birth control measures.

The attitudes toward population growth in Mexico in the past have been paradoxically akin to those of the Catholic Church on the one hand and the communist doctrine on the other. The Catholic Church's view against population control is based on moral and religious grounds. The communist opposition is based on the Marxist point of view that labor is the only creative factor of production. Mexico is a Catholic country where a Revolution took place in this century. According to Senior, the position of the official party, Partido Nacional Revolucionario (PNR), in 1935 was opposed to the neomalthusianism of the militarist and imperialist countries, and since Mexico was an underpopulated country in several areas it was assumed that an increase in population was a pre-condition for development [Senior, 1958, p. 120]. That same attitude was reiterated in the General Population Act of December 1947 [Eldridge, 1954, p. 15]. However, no recent statements to that effect were found.

As the population increased in the 20th Century, Mexico changed from a predominantly rural society to a society in which more than half of its inhabitants lived in urban areas with more than 2,500 inhabitants (Table 155). Yet in 1963, 60.1 percent lived in cities with less than 10,000 inhabitants [Mendez Napoles, 1969, p. 8, 9]. From 1930 to 1940

the rates of growth were 2.22 percent for the urban sector and 1.49 percent for the rural sector. For the period 1950 to 1960, the difference was even greater--4.89 percent in the urban sector and 1.51 percent in the rural sector. About three million persons, three-fourths of the natural increase in the rural sector, migrated to the cities [Mendez Napoles, 1969, p. 8].

The labor force (economically active population) increased from 4.6 million in 1910 to 8.3 million in 1950 and to 11.3 million in 1960, a rate of increase of 3 percent per annum in the decade of 1950 to 1960 (See Table 152). Although the number of economically active persons in agriculture increased continuously after 1921, there has been a net transfer of labor from agriculture to the other economic sectors, as indicated above in the transfer of nearly three-fourths of the natural increase in population of the rural sector to the urban sector in the 1950's. This shift in labor decreased the supply in agriculture from what it otherwise would have been and probably contributed to an increase in incomes per worker in agriculture. At the same time, the shifts to the higher paying work in the non-agricultural sectors, as employment expanded, was a factor in the increasing average levels of income (Table 158).

Despite the continuing large difference in average productivity, between agriculture and the other sectors, the demand for additional workers was limited in the non-

Table 158. Gross National Product^a, Total and Agricultural Sector, Mexico, Selected Years from 1910 to 1965

Year	Total GNP	Agricultural Sector ^b	Per Worker ^c	
			Total	Agriculture
	-----billion pesos-----		-----pesos-----	
1910	14.7	4.6	2,757	1,279
1921	15.9	4.6	3,152	1,380
1930	16.9	3.9	3,154	1,076
1940	22.6	5.4	3,732	1,410
1950	40.6	9.2	4,908	1,907
1955	54.8	12.2	d	d
1960	73.5	14.0	6,486	2,279
1965 ^e	98.2	17.3	7,430	2,504

^aIn constant 1950 prices.

^bIncludes crop, livestock, forestry and fishing.

^cBased on labor force given in Table 155.

^dData not available.

^eBased on 1964 labor force.

Source: Nacional Financiera, S.A., La Economía Mexicana en Cifras (Mexico, D.F.: Nacional Financiera, S.A., 1965), pp. 31-32.

agricultural sectors. Mexican observers reported masses of underemployed persons--persons engaged in relatively unproductive service occupations--and unemployed persons in the cities of Mexico.

Shanty towns around major cities show human life at levels of degradation far worse than those in the countryside--as migrants have transferred their poverty from rural areas to the cities. This movement has increased the pressures for public services, which has tied up substantial amounts of resources and encouraged additional migration. In relation to the United States, real wages in industry in Mexico remained at a low level [Horton, 1968, p. 26]. More than a half million "braceros" migrated to the United States in the 1940's. By remaining in the agricultural sectors, even if underemployed, they were able to establish a claim to a meager output, obtain the help of the family, and did not add to the huge welfare problems in the cities.

The agrarian reform did two things simultaneously. In some respects it increased the mobility of the agricultural labor force while in other respects it decreased their mobility. This apparent contradiction needs an explanation. Immediately after the Revolution, the debt peonage was abolished and the peon assigned traditionally to a latifundio was transformed into a potential agricultural entrepreneur by means of the distribution of land. Thus the peon could work his own land, he could offer his services to others in the agricultural

sector, he could offer his services to the industrial or service sectors, or he could emigrate to another country, particularly to the United States. This is the mobility factor which allowed the Mexican peasant to migrate to the cities or to emigrate to the United States whenever an opportunity was available.

Since the 1930's the growth in rural population and the increase in agricultural inputs that substituted for labor allowed migration to the cities while agriculture output continued to increase. The roads provided the physical means for this migration. At the same time, the rural migration into the cities helped to keep the urban wages low. These low wages allowed profits to increase and higher profit expectations stimulated the industrial development of Mexico in the 1940's and in subsequent years.

Mostly, migration moved from the South into the border regions of the North, where many of the newly irrigated areas were located, where important industries including tourism were located, and where there was the possibility of crossing the border into the United States. Another important area of in-migration was the Valley of Mexico [Barkin and King, 1970, p. 66], where the Federal District is located--a movement from the periphery to the center. Here, despite the fact that there was a lack of job opportunities, the alternative was to use federal welfare service programs which were lacking in many other parts of the country.

Where employment opportunities were not available in the cities, agrarian reform tended to tie the ejidatario to the land where he had a right to usufruct a piece of land, no matter how small the tract. He could establish a claim against output and engage in some purposeful activity, even if not productive, which gave some relief to the frustration in life. If he was not an ejidatario, but a member of the family of one, this would provide him the opportunity to establish this claim. And in many cases, when the distribution of ejidal parcels were made and he was not able to receive one, he still obtained a certificate stating that his rights to the land were latent ("derechos a salvo"). This latent right provided some hope that land would become available in the future. No matter how unrealistic this hope might have been, it was signed by the Federal Government and was a commitment to provide land to this peasant in the future.

The ties of the peasant to the ejidos were in many aspects more intense than the ties under the system of private property. Under private property one could sell his property, move, and receive something in exchange as compensation. The ejidos' parcels legally were not for sale. To move from the land meant that the ejidatario legally would lose his right to use of the land.

In 1910, only 1.6 percent of the economically active population in the agricultural sector were holders of land;

by 1940, after the intense land redistribution program by Cardenas, 61.7 percent of the economically active population in agriculture were holders of land. This percentage declined to 46.7 percent in 1960, as the economically active population increased at a faster rate than the distribution of land (Table 159).

The degree of underemployment is manifested in several ways in the agricultural sector: seasonal unemployment, low average productivity per man-hour due to the employment of less efficient work practices, sometimes a more leisurely pace of work in preference to an entirely idle time, and the presence of tiny plots are indications of less than full employment. To accurately measure the extent of underemployment in agriculture is difficult. If there had been a demand for labor elsewhere, a substantial number of the workers could have been replaced by mechanization. In a study in 1950, Yanez-Perez estimated that if tractor power were used instead of animal power whenever possible, due to the resulting increase in productivity per worker, 1.6 million laborers could have been released from agriculture. Based on that estimate and prevailing demographic and economic conditions, mechanization in agriculture could release as many as four million workers by the mid-1970's [Jaffe, 1959, p. 258 ff.].

In the study by Yanez-Perez, it was found that the highly mechanized farm, in comparison with the national average,

Table 159. Distribution of Population and Land Holders in the Primary Sector^a, by Type of Land Holding, Mexico, 1910, 1940, 1950 and 1960

Item	1910	1940	1950	1960
	-----1,000-----			
Population Economically Active	3,591	3,803	4,824	6,145
Holders of Land ^b	56 ^c	2,345	2,736	2,870
Ejidatarios	d	1,223	1,378	1,524
Private Owners				
> 5 Hectares ^e	36 ^c	193	353	447
≤ 5 Hectares ^f	21 ^c	929	1,005	899
	-----percent-----			
Land Holders as Percentage				
Of Economically Active				
Population	1.6	61.7	56.7	46.7

^aPrimary sector includes agriculture, fishing, hunting and silviculture.

^bHolders of land do not include the Indians who live apart from the remainder of the economy and obviously occupy some land but without legal title.

^cEstimated.

^dAgrarian Reform was not in effect.

^eThe number of private properties enumerated in the Censuses, excluding those of communal or government ownership. The exact number of owners will differ if a person owns several farms or if one farm belongs to several persons.

^fFigures refer to the number of farms, one owner per farm is estimated.

Sources: Censo Agrícola, Ganadero y Ejidal, Several years; Censos de Población, Several years; Dirección General de Estadística, Anuarios Estadísticos, Several years.

used 60 percent less labor in the production of beans and 35.5 percent less labor in the production of corn. Potential reductions amounted to 57.3 percent in wheat, 48.2 percent in sugarcane, 16.8 percent in cotton, and 8.8 percent in coffee (Table 160). The ejido system was a way to keep excess labor occupied at least part of the time which probably contributed to the keeping of peace in the Mexican countryside.

An indication of the excess labor in the ejidos can be obtained from ejidal demographic characteristics reported by the Agricultural Censuses. In 1960, of 1,524 thousand ejidatarios who possessed land, 538.4 thousand worked outside the ejidos; thus 35.3 percent of the ejidatarios worked outside their ejidal plots. However, of those working outside, 72 percent worked as agricultural laborers on other people's land while only 28 percent worked in commerce and other sectors. The number of persons per ejidal plot increased from 4.6 in 1950 (1,317 thousand families with 6,037 thousand members) to 5.2 in 1960 (1,387 thousand families with 7,250 thousand members).

Another factor that probably has reduced the rate of movement of labor from farms to non-farm work has been the adoption of labor saving capital in industries—capital imported from the highly developed countries where labor is more costly.

In the subsistence activities, the increasing supply of

Table 160. Labor Inputs: National Totals and Estimated Potential Under Mechanization, Mexico, 1950

Crop	Hours Worked		Difference	Reduction
	National Total	Necessary Under Mechanization		
	-----million-----			(percent)
Cotton	243.4	202.6	40.8	16.8
Coffee	215.7	196.8	18.9	8.8
Beans	258.4	103.3	155.0	60.0
Corn	1,565.2	1,009.2	556.0	35.5
Wheat	63.7	27.2	36.5	57.3
Sugarcane	181.7	94.1	87.6	48.2

Source: Yanez-Perez, Luis, "Una Hipotesis Sobre los Objetivos en la Mecanización Agrícola de México," Investigación Económica, Vol. XVII, No. 66 (Second trimester, 1957), p. 229.

labor creates its own demand. This demand, however, is hardly sufficient for full employment and growth. While there has been growth in market demand for agricultural output and increases in the supplies of inputs complementary with labor, as discussed in preceding chapters, these increases have not been sufficient for maintaining full employment and increasing the incomes at the margin.

Level of Living

The 1960 Population Census provides some information on the levels of living in Mexico, both in its rural and in its urban sectors. For the characteristics of the level of living reported, the indications point toward a much higher level in the urban areas in comparison with the rural areas (Table 161). Even in the consumption of meat and livestock products, items produced on many farms, the percentage of persons reporting consumption was higher in the urban sector. There has been a shift from "tortillas" to wheat in the basic diet (Table 162). This change might be considered a move from traditional to a more modern diet. But it may also reflect the changes in economics of producing wheat vs. corn.

The daily per capita consumption of calories has increased significantly since the Revolution. In 1934-1938, the average daily per capita consumption was 1,800 calories; in 1960, it was 2,654--an increase of 47 percent. The consumption of proteins, in the same period increased 26 percent--from 53

Table 161. Level of Living Characteristics, National,
Urban and Rural Sectors, Mexico, 1960

Characteristic	Mexico	Urban	Rural
	-----percent of population-----		
Eat Wheat Bread Regularly	68.6	87.3	49.4
Usually Eat Either Meat, Fish, Milk or Eggs	75.9	87.4	64.0
Wear Shoes	62.3	84.3	39.6
Wear Sandals	23.4	9.4	37.9
Go Barefoot	14.3	6.3	22.5

Source: Censo General de Poblacion, 1960.

Table 162. Population^a Regularly Eating Tortillas, Instead of Wheat Bread, Mexico, 1940, 1950 and 1960

Year	Persons (1,000)	Percent of Total
1940	10,796	54.9
1950	11,384	45.6
1960	10,619	31.4

^aOver one year old.

Source: Censo General de Poblacion. Several years.

grams to 67 grams. The increase in proteins was from vegetable sources as average daily per capita consumption of animal proteins remained almost constant at 18 to 19 grams [Secretaria de Agricultura et al., 1965, p. 74].

The wearing of shoes might also be associated with level of living in Mexico. While 84.3 percent of the urban population reported the wearing of shoes in 1960, this figure was only 39.6 percent in the rural sector. In the total population, over one year old, the proportion going barefoot decreased from 26.6 percent in 1940 to 14.3 percent in 1960 (Table 163).

One indication of the educational level in Mexico is the rate of illiteracy. In 1910, over three-fourths of the Mexican population was illiterate. The rate of illiteracy has been substantially reduced through the education programs of the Government; attempts have been made to make formal education available to all sectors of the nation. In 1960, 37.8 percent of the Mexican people six years old and over were illiterate, over 10 million persons, despite the advancements in education, which began in 1921 when the Federal Government assumed responsibility for elementary education (Table 164). The rate of illiteracy in the rural sector was more than twice the rate in the urban sector. The percentage of those between 6 and 14 years of age not receiving formal schooling decreased from 54.7 percent in 1940 to 36.6 in 1960 [Ross, 1966, p. 220].

Table 163. Proportion of Population^a Wearing Sandals and Those Barefoot, Mexico, 1940, 1950 and 1960

Year	Sandals		Barefoot	
	1,000 Persons	Percent	1,000 Persons	Percent
1940	4,630	23.6	5,233	26.6
1950	6,641	26.6	4,769	19.1
1960	7,912	23.4	4,828	14.3

^aOver one year old.

Source: Censo General de Poblacion. Several years.

Table 164. Illiteracy in Mexico, Census Years, 1910 to 1960

Year	Persons	Percent of Total
	(1,000)	
1910	9,965	76.9
1921	8,813	71.2
1930	9,018	66.6
1940	9,411	58.0
1950	8,942	42.5
1960	10,573	37.8
<hr/>		
	<u>Sector</u>	
1960	Urban	24.2
1960	Rural	51.7

Source: Censo General de Poblacion. Several years.

The emphasis on rural education followed the agrarian revolution of 1910--Zapata's war cries were "land and liberty; land and schools". Improvements have been made, yet in recent years substantial differences have persisted between urban and rural education as indicated by the different educational indexes given in Table 165.⁷ While the number of graduates per student registered was 14 times greater in the urban sector than in the rural sector in 1950, it was only 3.5 times greater in 1965. The percentage of school age population attending schools was 15 percent lower in the rural sector, and the rate of drop-outs from schools in the rural sector was 5 times greater than in the urban sector. Several reasons have been given for explaining these differences: the greater percentage of children not speaking Spanish in rural areas, and the need for labor supplied by the children to the fathers in farm areas. But also a contributing factor is the "unitary system" of teaching in the countryside, i.e., one teacher for several grades, with some grades missing in a number of schools.

At the secondary level in 1966, 63 institutions were offering agricultural education (Escuelas Normales Rurales and Centros Regionales-Normal Rural Schools and Regional Centers); 18,000 students were registered in those schools,

⁷A problem is that education in rural schools is oriented toward farming and ignores the need for a different type of education by the children that later will migrate to the cities.

Table 165. Urban and Rural Education Indexes, Mexico, 1950, 1960 and 1965

Item	Urban			Rural		
	1950	1960	1965	1950	1960	1965
	-----percent-----					
Promotion to Higher Grades in Primary Schools	80	83	85	68	75	77
Student Retention from One Year to the Next	85	90	94	26	59	67
School Age Population Registered in Schools	-	69	71	-	47	53

Source: Mendez Napoles, Oscar "Los Recursos Humanos en el Marco del Desarrollo Economico y Social del Sector Agricola," in Mendez Napoles, Oscar et al. Los Recursos Humanos y el Desarrollo Agricola, (Mexico, D.F.: Ediciones Productividad, 1969).

i.e., 1.7 percent of the total registration in secondary schools in that year, and due to the inappropriate locations, 70 percent of the registered students came from the cities. At the university level, only 3.5 percent of the registration was in agricultural careers (including veterinary training) in 1966. In that year it was calculated that there was a deficit of 4,000 agronomists, 5,000 veterinarians, and 9,000 agricultural technicians in Mexico [Mendez Napoles, 1969, pp. 20-21].

Elementary informal teaching about home economics--dress, clothing, housing, and nutrition--reached only 1.5 percent of the rural communities in 1960 [Mendez Napoles, 1969, p. 21].

Spanish is the official language of Mexico and is the language used in all legal and most commercial transactions, but native Indian dialects continue to be spoken in many isolated parts of Mexico. The inability of a person to speak Spanish can, therefore, be constructed as a handicap to that person. At the beginning of the Revolutionary War, 13 percent of the population of Mexico spoke only an Indian language--one and a half million persons. By 1940 that percentage was reduced to 7.4 percent, and by 1960 it was reduced to 3.8 percent (Table 166). These changes indicate a trend toward national integration and the development of more uniform characteristics of the Mexican population. But one million persons were still isolated from the main means

Table 166. Population Speaking Only an Indian Language,
Mexico, Census Years, 1910 to 1960

Year	Population	Percent of Total
	(1,000)	
1910	1,618	13.0
1921	1,261	10.2
1930	1,185	8.5
1940	1,237	7.4
1950	1,069	4.9
1960	1,105	3.8

Source: Censo General de Poblacion. Several years.

of communication of the country by the language barrier. The percentage of the ejidatarios who spoke only an Indian language (3.6 percent) was approximately equal to the national average while the percentage of the private farm owners was less, 1.7 percent.

The number of persons living in small communities with less than 2,500 inhabitants—classified as rural areas—is an indication of the degree of isolation of the population from the basic services. In the 1940's a study of 3,611 rural communities showed that 93.1 percent of them had no type of formal communication system [Tannenbaum, 1966, p. 375]. Another study of a number of rural communities showed that 97.8 percent of them had no doctor available [Avila, 1969]. The proportion of the population living in villages with less than 2,500 inhabitants was 71.3 percent in 1910, 64.9 percent in 1960.

There have been substantial improvements in the levels of living of the Mexicans—in their diet, clothing, health and education—but still there are areas of poverty in which Mexicans live at levels similar to those that prevailed before the Revolution. These areas are concentrated in, but not limited to, the rural sector.

Social security programs, despite the fact that the Revolution took place in the decade beginning in 1910, were not established in Mexico until 1942 when the Instituto Mexicano del Seguro Social was created; and then only the

urban workers were covered. It was not until 1954 that rural workers were covered by the program. In 1959, during the administration of President Lopez Mateos, self-employed persons including small farmers and ejidatarios were included in the social security system.

Initially the social security system covered insurance against accidents and sickness due to employment, disability, old age, death, and unemployment caused by illness, pregnancy, and dismissal at advanced age. In 1956, medical, educational and social services were included [Coquet et al., 1964, Vol. I, p. 21].

Although the Mexican government paid 75 percent of the insurance premiums of ejidatarios and small farmers, only a small percentage of the total agricultural workers was covered (Table 167).

Social Classes and Mobility

As economic development of Mexico has taken place a stronger middle class--mainly urban--has appeared in the social structure, but the lower class is still the main component of the Mexican social structure (Table 168). Thus, there appears to be an increase in the vertical social mobility. There is also some evidence of a tendency of workers to move to higher status occupations than those held by their fathers and grandfathers (Table 169). The Revolution probably reduced the barriers and permitted this vertical

Table 167. Persons Insured by the Instituto Mexicano del Seguro Social, Mexico, 1944 to 1967

End of Year	Total Persons	Urban Workers	Rural Workers
		-----1,000-----	
1944	137	137	--
1945	207	207	--
1946	247	247	--
1947	287	287	--
1948	318	318	--
1949	340	340	--
1950	374	374	--
1951	399	399	--
1952	435	435	--
1953	465	465	--
1954	500	497	3
1955	583	572	11
1956	670	650	20
1957	759	734	25
1958	900	872	28
1959	1,004	973	31
1960	1,181	1,153	28
1961	1,347	1,316	31
1962	1,519	1,479	40
1963	1,768	1,627	141
1964	1,953	1,797	156
1965	2,191	1,911	280
1966	2,315	2,029	286
1967	2,470	2,172	298

Source: Coquet, Benito et al., La Seguridad Social en Mexico, I, (Mexico, D.F.: Instituto Mexicano del Seguro Social), pp. 238 and 240-242; Banco Nacional de Comercio Exterior, Mexico: 1968, (Mexico, D.F.: 1969), p. 358.

Table 168. Distribution of Families Among Social Classes, Mexico, 1910 and 1963

Social Classes	1910	1963
	-----percent-----	
Upper	0.6	14.4
Rural	0.4	4.2
Urban	0.2	10.2
Middle	8.3	22.6
Rural	6.6	8.7
Urban	1.7	13.9
Lower	91.1	63.0
Rural	74.8	47.0
Urban	<u>16.3</u>	<u>16.0</u>
Total	100.0	100.0

Source: Gonzalez Cossio, Arturo, "Clases y Estratos Sociales" in Mexico: 50 Anos de Revolucion, Vol. II, La Vida Social, (Mexico, D.F.: 1961), p. 55; Banco de Mexico, Encuesta Sobre Ingresos y Gastos Familiares en Mexico, 1963 (Mexico, D.F.: Banco de Mexico, 1966).

Table 169. Occupation of Workers in Relation to Occupation of Workers' Fathers and Grandfathers, Mexico, 1964-1965

Position of Workers	Distribution of Workers in Relation to Occupations of Their:		
	Father	Paternal Grandfather	Maternal Grandfather
	-----percent-----		
Inferior	10.7	6.4	6.2
Equal	66.7	58.8	56.3
Superior	18.2	16.7	14.8
No Information	<u>4.4</u>	<u>18.1</u>	<u>22.7</u>
Total	100.0	100.0	100.0

Source: Secretaria de Industria y Comercio, La Poblacion Economicamente Activa de Mexico, 1964-65 (Mexico, D.F.: 1965).

movement in socio-economic status.

Another indication of the increase in flexibility of the social structure of Mexico has been the increase in horizontal social mobility or internal migration. In 1960, 15.0 percent of the population lived in places other than their place of birth; in 1910, only 6.9 percent had moved from their place of birth (Table 170). The main factors that accounted for this movement were the reduction in the extent of the feudal system of rural servitude, the construction of highways and new cities as irrigation works were developed.

In rural Mexico the new land tenure structure that followed the Revolution brought significant changes. In 1960 over 50 percent of the economically active population in the primary sector worked their own land (ejidatarios, private owners, commoners). Yet 144 thousand persons were renting, 74 thousand ejidatarios were without land and, more important, the number of day laborers--agricultural workers without land--was greater than the number of ejidatarios who benefited by the Revolution (Table 171).

Mexicanization of the Land

It was estimated that 42 percent of the national wealth was owned by foreigners during the Porfirio Diaz regime [Singer, 1969, p. 51]. A significant part of the land owned by foreigners was used to produce commodities for export. The

Table 170. Internal Migration, Mexico, 1910, 1960

Place of Birth	1910	1960
	-----percent-----	
Same as Residence	93.1	85.0
Other Than Residence	<u>6.9</u>	<u>15.0</u>
Total	100.0	100.0

Source: Colegio de Mexico, Estadisticas Sociales del Porfiriato (Mexico, D.F.: 1965); VIII Censo General de Poblacion.

Table 171. Structure of Economically Active Population in the Primary^a Sector, Mexico, 1960

Classification	Number of Persons (1,000)	Percentage
Private Owners	1,299	21.1
>5 has. ^b	(391)	(6.4)
≤5 has. ^b	(899)	(14.6)
Colonists	(9)	(0.1)
Working on Another's Land	144	2.4
Sharecropper (Aparceros)	(117)	(1.9)
Occupant (Not Paying Rent)	(5)	(0.1)
Cash Tenants	(21)	(0.4)
Ejidatarios ^c	1,524	24.8
Commoners (Comuneros)	350	5.7
Other Types of Possession	7	0.1
Ejidatarios Without Land	74	1.2
Day Laborers (Peones)	1,946	31.7
Employees	143	2.3
Workers Without Pay	101	1.6
Others	499	8.1
Minors (Less Than 11 yrs. Old)	53	1.0
Total	6,145	100.0

^aPrimary sector includes agriculture, silviculture, and fishing.

^bIt was estimated each person owned only one farm.

^cEjidatarios with land.

^dEstimated.

Source: VIII Censo General de Poblacion, 1960; IV Censo Agricola, Ganadero y Ejidal, 1960.

Revolution of 1910 had the Mexicanization of the land as one of its objectives. By 1960, this action was almost completed. The Agricultural Census surveyed 169 million hectares and less than 1 percent of this land was owned by foreigners (Table 172). In order to hold the land, foreigners had to give up any rights to protection from their respective governments with regard to their claims on these properties.

Also the right to acquire land within the Mexican borders and seashores is restricted, by the Constitution of 1917, to Mexican citizens.

Political Associations

Mexican agricultural population, in the early years following the peak of the Revolutionary War, was not united in a single movement. There were different organizations claiming peasant memberships--Confederacion Obrera Mexicana, Partido Nacional Agrarista, Liga Nacional Campesina, Liga Central de Comunidades Agricolas, Confederacion General de Obreros y Campesinos, and others. Consequently the peasants had little influence as they were spread among so many organizations.

In 1933, just one year before his election, Cardenas gave his support and the support of the official party (Partido Nacionalista Revolucionario) to the unification of the peasants' movement. The Confederacion Nacional Campesina (CNC) was created in 1938 and unified all the peasant groups; at

Table 172. Nationality of Owners of Land, Mexico, 1960

Nationality	Area	Percent of Total
	(1,000 hectares)	
Mexico	167,990	99.35
U.S.A.	613	0.36
Spain	216	0.13
Others	<u>265</u>	<u>0.16</u>
Total	169,084	100.0

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

the local level Peasant Leagues (Ligas Campesinas) associated with the CNC were established. All the ejidatarios were made members of the CNC--at least nominally-- and it became the farmers' sector of the official party (Partido Revolucionario Institucional).

In addition to the ejidatarios, persons claiming land under the agrarian reform laws, unions of rural workers and peasant cooperatives, the small agricultural landholders, and persons who supported the agrarian ideals could be members of the CNC. Initially, the CNC was the only organization, representing the agricultural sector officially, that had any substantial influence. In the following years, CNC retained the position as principal representative of the agricultural interests, especially the interests of the ejidatarios.

The private farm owners belonged either to the Confederacion Nacional de la Pequena Propiedad Agricola or to the Asociacion Nacional de Cosecheros. These are small but very influential organizations, handled by the wealthiest and most politically active individuals. They are associated with the official party, not through the Agrarian sector (CNC), but through the Popular sector, which, together with the Labor sector, constitute the three sectoral bases of the Partido Revolucionario Institucional (PRI). The Popular sector is not organized in the same manner as are the other two functional sectors. The Popular sector is composed of

a large number of associated groups, including teachers, government employees, intellectuals, military heroes, women and youth groups, and private farm owners. In general, it represents the interests and aspirations of the middle and upper middle income groups. In practice, the Popular sector is the most important of the three, since most of the national leaders of Mexico (presidents) have come from it; its professional members had a higher propensity for political activities than the less educated members of the other sectors.

Farm wage earners are frequently represented by a union member of the Labor sector, but this sector has promoted mainly the interests of the industrial workers, who are more highly organized and disciplined. The Labor sector is dominated by the Confederation of Mexican Workers (Confederación de Trabajadores Mexicanos CTM).

The CNC leaders, in many cases, have come from outside the agricultural sector, and taken advantage for political purposes, of the ejidatarios who depended on the government for aid which they easily manipulated. Every ejido is supposed to elect its delegates to the local peasants committees and these committees in turn are supposed to elect the state's league of peasants leaders, who finally should elect the CNC executive committee; but in practice, it is a vertical association with the power structure centered from above (*desde arriba*), rather than from below, and the

participation of the ejidatarios is mainly ceremonial. In practice, the President of Mexico selects the CNC leaders in private and the election of them is automatic, as one slate of candidates is in general the rule. The leaders selected in this form are called "charros" leaders by critics of the system; they respond to the President, not to the masses. The CNC is a means by which the President and the PRI control the vast majority of the peasants. Nevertheless, CNC provided a means through which demands, complaints and aspirations could be made known to the government, to the official party and to its leaders. Similarly, the internal organization of the ejidos which is supposed to be democratic is really not so in practice. The small political bosses and the private vested interests frequently control the ejidatarios' general assemblies. Despite this control, they do discuss the ejidos' problems frequently which serves as an apprenticeship in the government of their own affairs.

The Mexican political system developed into a one official party system. This party, whose initial name was the Partido Nacional Revolucionario in 1929, was founded under the sponsorship of President Calles. The party was to provide, as its main accomplishment, an institution in which conflicting interests were to be compromised and subordinated to the party interests, thus avoiding open conflict and civil war. The system is a presidential type of government where the president, at the same time that he is vested with extensive

powers, i.e., influencing the selection of candidates for Congress, the Supreme Court, and State Governors, having the right to initiate and veto legislation and to select his successor after consultation with the Revolutionary Family that consists of ex-presidents and influential leaders, is also the leader of the official party. Each presidential term is for six years, and re-election is not allowed.

By not allowing re-election, political mobility as well as social mobility was permitted. Government positions, due to the prevalence of corrupt practices, were a means of achieving wealth through government contracts, entry as an entrepreneur into the private sector, and entry by means of the marriage of a daughter or son into the circle of aristocratic wealthy families. The designated successor to the President is usually a cabinet member--not a single president has come from the Labor or Agrarian sectors.

In 1937 Cardenas dissolved the PNR, which had been trying to establish itself along the lines of a popular front of several parties. Cardenas organized the Partido de la Revolucion Mexicana on a functional basis, with four sectors--Agrarian, Labor, Popular, and Military. In 1940, only three sectors were left. The Military sector was abolished and since then the role of the military has been substantially reduced.

During the Cardenas period, the prevalent ideology of the official party (and consequently of the government)

emphasized socialist ideals as well as economic interpretations of history. These were reflected in the 1934 ammendment of Article 3 of the Constitution which refers to education in Mexico. Official textbooks of the time expressed this view [Duncan and Goodsell, 1970, pp. 101-103].

The next two presidents, Aleman and Avila Camacho, had a different ideology. Their emphasis was on democratic, instead of on socialist ideology. Themes of national unity through cooperation among classes replaced the previous emphasis on class struggle. Again Article 3 to the Constitution was modified in 1946, as well as the official textbooks, to reflect these shifts in the prevailing ideology of the presidents [Duncan and Goodsell, 1970, pp. 107].

No single ideology has guided Mexican governments in their desire to achieve development; they have been pragmatic, and trial and error has been the method employed.

By 1946, President Avila Camacho changed the name of the official party to Partido Revolucionario Institucional. The three functional sectors of the official party were to be the basic organizational divisions of the party. Each sector was to remain autonomous in the social and economic sphere, but the central organization of the party would be in charge of political decisions. Through its three sectors the PRI provides each citizen an opportunity to participate in the political process, letting his views and aspirations be known with respect to government action. The path has led

toward political democracy (freedom of press, speech, assembly, and worship are respected) with emphasis on civil peace and national unity.

The PRI describes itself as a political organization that supports the principles of the Mexican Revolution and whose objectives are to acquire and maintain the power by vote with the goal of conserving stability and accelerating the socioeconomic development of the country through the constant participation of people in government. An effort was made in the 1960's to "democratize" the internal structure of the PRI through a system of municipal party primaries; the effort, while unsuccessful at the time, may indicate a trend for the future [Hansen, 1971, p. 227].

Many small opposition parties that were founded in electoral periods have subsequently dissappeared. The only sustained opposition parties have been the Union Nacional Sinarquista (1937) and the Partido Accion Nacional (PAN) (1939). Both parties have similar political platforms but differ in constituents. The Union Nacional Sinarquista consists of uneducated peasants guided by church-related leaders; it has abstained in the elections on several occasions. The Partido Accion Nacional is composed of members of the middle class as well as members from industrial, commercial and banking sectors of the economy. The political platforms of these parties are based on the repeal of the agrarian reform, support of municipal freedom, and the

suppression of political activities in the workers' unions.

Up to 1943, Congress was composed of members of the official party only. Since that year, PAN has been represented in it as the main opposition party. But the overwhelming majority consists of PRI representatives. In 1967, the PAN had 20 deputies, the Partido Socialista Popular (PSP), a leftist organization, had five deputies, and the PRI had 176 deputies. The function of interest groups up to the present has been to extract favors from the official parties; in many cases, the opposition deputies have been "elected" from above by the President [Hansen, 1971, p. 103].

The establishment of the ejidos by the Revolution as the essential and typical element in the rural society has contributed greatly to the political stability of Mexico. To the great majority of ejidatarios, possession of land appeared to be an end in itself and the Revolution provided it for them; thus, they feel a close attachment to the Revolution. A main objective of the ejidatarios was the preservation of the pseudo-property of the ejidal plot, even if this represented illusory gains from an economic viewpoint.

The ejidatarios have seen that their historical enemy, the haciendas, has disappeared. New exploiters have appeared in the forms of money lenders and local political bosses (who may be a local politician or the ejidal commissioner) but they do not interfere in the ejidatarios' right to live on their plots of land. As the ejidos are most highly

concentrated in the central plateau, conflicts with the highly capitalized irrigated estates located primarily in the low-lying areas and in the North have been minimized. The ejidatarios appear to be village oriented traditionalists who tend to be relatively contented with being left alone with their plots of land (or their hopes of getting one). Despite the degree of their poverty, they have a basis for hope, as all the post-revolutionary government leaders have made frequent declarations in which they supported the peasants' ideals, emphasized the results of the redistribution of land already achieved, and promised social and economic complementary inputs [Chevalier, 1967, pp. 179-187]. President Diaz Ordaz, in his annual State of the Union address to the Nation in 1968, stated that "The Mexican Revolution is essentially and basically antilatifundium....The theory of overall development for our people considers the terms justice and equality of the foremost importance. We not only want to increase the wealth but also to insure its adequate social distribution..."["Diaz Ordaz' 1968 State of the Union Address", 1970, p. 117].

The emphasis, since 1940, of the Mexican governments in achieving development through industrialization and large commercial farming resulted in a strategy of reward to those sectors in the forms of tariffs, tax exemptions, rebated duties on imported raw materials and machinery, and investments in infrastructure (mainly irrigation and roads).

Relatively little was spent on social welfare to substantially reduce the differences in income distribution, despite the fact that the main commitment of the 1917 Constitution was to improve the life of the peasants and workers.

The stipulation of no re-election in a presidential system of government means that every six years in the process of selecting a new president, serious thought is given to the changing political environment. In his political speeches, as he travelled through Mexico's small villages during the last presidential campaign, the present President of Mexico, Luis Echevarria, said:

We are not to the left nor to the right, but neither to the center. We are in another dimension...The Mexican concept of the Revolution is different. It tends upward and goes on forward...[Carrion, 1970, p. 165].

Something should not be announced and another thing be done. Our realities should not be also placed obliquely and live on fantasies... Upward because the line of fate of Mexico is to excel and is projected above the factions and the partial interests, the extremes and the intolerances, that it separates similarly from social anarchy as from the tyranny of the State... Forward because it marches toward the progress in liberty, toward the transformation of the society and the integral improvement of the Mexicans. Our Revolution is unfinished and in admitting it, it accelerates its march: it will not go face downward nor will it turn its back to become a statue of salt. Its final end is the man, who genetically, biologically and socially never goes backward. Therefore, we go with the people and its institutions, upward and forward [Echevarria, n.d., pp. 2-4].

The visits of Echevarria to the small villages of Mexico, during his campaign, as well as the content of his speeches indicate the Mexican government's present concern with poverty, in some parts of the Mexican countryside, which is associated with overpopulation in the ejidos. No signs of significant unrest have appeared in the Mexican countryside, but student unrest took place in Mexico City in 1968. It was repressed with over 200 deaths. Frustration with the differences between the Revolutionary achievements and the ideals of the students is one hypothesis as to the cause of the unrest. Time has yet to tell whether or not the concerns expressed by Echevarria can be transformed into action in time to alleviate the situation in the countryside before repression is needed.

CHAPTER IX

SUMMARY AND CONCLUSIONS

The objective of the present study was to evaluate the Mexican agrarian reform in its overall economic, social, political and legal context and in connection with other matters related to economic and social development in Mexico, especially as related to agriculture. The analysis gives consideration to the motives and objectives as well as accomplishments of agrarian reform and related actions. The Mexican agrarian reform has been a continuous process from 1915 to the present time. It has had physical and historical as well as social and economic constraints.

Population and production patterns have been influenced by geographic conditions. The mountainous terrain and scarcity of water have prevented cultivation in large areas. The soils, in most parts of the country, need irrigation if they are to be used in agricultural pursuits.

Historically, most of the native Indian population of Mexico held land under a functional land tenure system, in which land was assigned to individuals for specific purposes but ownership was retained by the King, as the representative

of the community. Spanish laws after the conquest recognized the communal type of property among the Indians, but these types of land property came under attack after the Dis-amortization Law of 1856. During the Porfirio Diaz regime, the attack against the Indian communal land properties was intensified, and the hacienda became the typical feature of the Mexican countryside.

The main reason for the hacendados' attack on the free landholding villages was their desire to acquire the Indian labor at a low cost. Thus, if the Indians were not allowed to have cornfields, they would have to work for the hacendados. The hacienda was a stagnant, self-sufficient system of production, that depended upon a cheap and plentiful labor supply.

In 1910, under the coverture of political reasons, the Mexican Revolution started. As the Revolutionary War was intensified, the agrarian problem became clearly one of its main factors as indicated by Zapata's "land and liberty" banners.

The decree of Restoration and Dotation of the Ejidos by Carranza's provisional government in January, 1915 was the first element of the Agrarian Reform. Article 27 of the Constitution specifically outlined the policy to be followed by the revolutionary governments with reference to the agrarian problems. Land redistribution programs were started for political and social reasons under the pressure exerted by Zapata's peasants seizing the land. No thought was given to

the idea of establishing economically optimal agricultural units. The initial motivation for the Mexican revolutionary leaders was political--initially to protest the lack of democratic elections. However, as the war progressed, social objectives developed among the peasant masses.

No initial plan or study was made on how to solve the socio-economic problems in the Mexican agricultural sector at the time of the Revolution. Problems were attacked as they were seen. Nationalism was one guiding force as there had been two wars with foreign nations (France and the United States) and some of the lands were in foreign hands. The first thing to do was to return the land to Mexicans. The other ideological objectives were generally broad--to improve the well-being of the peasants, to work toward achievement of social justice and progress, and after the 1930's the goal of economic development was added. Ideology provided a guide but the Mexican revolution was basically pragmatic. The immediate circumstances were the prevalent concerns. Neither intention nor the idea of doing all that has been done was ever in the minds of the early revolutionary leaders. Pragmatism prevailed also because the revolutionary leaders did not come from any one group or faction, nor from those with identical ideas. Consequently, they had to compromise among themselves and with the leaders of the pre-revolutionary movement that had survived politically. Ideology, compromise, and pragmatism were the results. These results can be seen

in the great number of laws, decrees, rules and regulations dealing with the agrarian reform program, many of which were inconsistent with one another.

The Mexican Revolution in its general program tried to achieve, through its agrarian reform program, the objective that has been broadly present in all land reform programs--enhancing the human dignity of the rural population and, more specifically, restitution of land to the Indian villages to satisfy the land hunger of the peasants, and a more equitable distribution of the wealth via the destruction of the latifundios. Implicitly in the general goal were the objectives of a greater social and economic equality, a greater degree of political stability, and an increase in the level of agricultural production. These objectives were to be achieved through the abolition of the feudalistic type of system prevailing in Mexico in the early 1900's and through the development of a nationalistic environment by abolishing the estate ownership by foreigners, and by removing the prevailing colonial mentality existing in Mexico through the "malinchista" ideas of the "cientificos." Initially, the destruction of the enslaving and feudalistic system was the main objective--social and political motives prevailed over economic ones until 1930.

What type of rural structure was to be developed in Mexico to replace the feudalistic type of organization, i.e., the hacienda? Nationalism was very intense in Mexico, and

mechanization was considered to be associated with foreign control of the country. Also, there was an extensive supply of labor and armed peasants were crying for "land and liberty." Something had to be done to abolish the haciendas and bring peace to the Mexican countryside. Mexican history provided the answer and the ejido was re-established along the lines of the "calpullali," "tlatlmilli," and "altepetlalli" of the Aztecs and the Spanish ejido of the colonial era. There were to be two types of ejidos: those held in the form of individual plots and those worked collectively. In both types the property of the land belonged not to individuals or groups of individuals but to the community as a whole. The collective ejido was the type chosen by the existing Indian communes and was the system imposed by President Cardenas when he expropriated the plantations in the North in the 1930's. But the collective ejidos are a small minority among the total ejidos in Mexico.

The land of the individual ejido is divided into ejidal plots and worked individually--similar to a private property but with legal restrictions on its transfer. Due to the small size of the plots and the lack of capital, this system can be considered as an individual, artisan type of agriculture.

Ownership of Mexican land was limited to Mexican citizens. The initial property rights to the land belonged to the State, who had the power to transfer and organize it as it saw fit. In addition to the ejidos a system of "small" private property

owners was developed. Small was not a definite concept, as the size varied according to the use and type of land.

During the 1915-1934 period uncertainty and indecision prevailed. Due to a fear of disrupting agricultural production only 6 percent of the area affected by the agrarian reform legislation was redistributed. Contradictions and frequent changes of criteria prevailed among the agrarian authorities and in the regulations. The immediate objective was to reverse the past by returning the lands that had been taken by the hacendados, to the villages. But the reformers had different objectives than the peasants; the reformers considered the ejido as a transitory step toward the small private property system. The opponents of the agrarian reform restricted the eligibility for the petition of land to certain specific political categories of villages. The peons were excluded from the right of petition, and the latifundists were given the right to choose the land that they would keep. Another legal obstacle to the progress of the reform was that the execution of the law was dependent on the peasants' initiative. The peasants were often illiterate and ignorant of their rights, and the latifundists in the last instance could resort to the use of court injunction ("amparo") to prevent any expropriatory action. From 5 to 20 years were required to obtain a provisional adjudication of land. Consequently, children at the time of the petition were men at the time of adjudication and minifundia in the

ejidos was the result.

Major purposes of the ejidos were to satisfy the social hunger for land, and to prevent reconcentration of land by keeping it out of the market, and to provide a job for the ejidatarios' family members. Initially, the ejidos were not provided with credit or capital. Labor and land, abundant resources in Mexico, were the main factors of production. But much of the land could produce very little output in the absence of irrigation. The private property holders, composed mainly of the haciendas' best lands that the old latifundists were allowed to retain, were given the main economic assignment of providing the agricultural goods needed in the urban markets of Mexico and for exports.

During his presidential period of 1934-40, President Cardenas decided that, since a large segment of the Mexican land had been organized as ejidos, these should have economic functions in addition to their social functions. He initiated programs to provide them with credit in order for them to obtain the needed complementary capital inputs. Cardenas and the following presidents gave extraordinary impulse to the irrigation programs throughout the nation, as a result of studies that refuted the idea that there was plenty of productive land in Mexico. These irrigation works had decisive results in stimulating agricultural production as they were complementary to the use of other modern improved inputs such as fertilizers, improved seeds, modern equipment, and

disease and pest control measures.

Cardenas encouraged the formation of the National Confederation of Peasants (CNC) and the formulation of the first Agrarian Code. He also did away with the idea of the ejido as a stepping stone toward private ownership and as a way to supplement the salary of the day laborer. He extended to the day laborer (peons) the right to petition for land, and with the help of the CNC he implemented the agrarian reform from above by expropriating the highly productive export producing areas of the La Laguna, Yucatan, Lombardia, Nueva Italia, and Yagui.

Between 1940 and 1958, the presidents shifted the emphasis from land redistribution and the ejidos to irrigation and providing the private sector with security. The preference to the ejidos in the irrigation districts was cancelled, the right to ask for court injunctions (taken away by Cardenas) was restored to the private owners, extensive use was made of the livestock's unaffectability certificates, and to promote exports greater areas of certain agricultural products were declared unaffectable. A new agrarian code was passed in 1942 to include the new regulations. Since then there has been legislative stagnation in agrarian reform matters. The 1942 Agrarian Code, with no significant change, prevails at the present time.

From the early 1960's to the present time, as the mass seasonal immigration of braceros to the United States has

tapered off and population pressures have increased, political pressures again developed for re-emphasis of the agrarian program.

These pressures together with the socio-economic philosophies of the presidents of this period resulted in the renewed emphasis on the development of the ejido as a unit of production. The Colonization Law of 1956 was abrogated and a new one was passed that specifies that new settlements must be in the form of ejidos, and a negative position was maintained with reference to renewing the unaffectability certificates for livestock.

In 1960, within the agricultural sector, the ejidos included 43.4 percent of the cropland, 26.3 percent of the total land, 44.4 percent of the labor force, 25.8 percent of the capital stock, and produced 40.8 percent of the value of total crop production and 33.7 percent of total production, including livestock and forestry products.

The agrarian structure together with the programs of the different governments in credit and irrigation have enabled the agricultural sector of Mexico to perform the basic functions expected of an agricultural sector in the development process. Agricultural production has been increasing at significant rates, especially in crop production. Variability in yields through the years was reduced as the government programs contributed to the reduction of the effects of uncertain factors. Livestock production has not

increased as fast as crop production; it was retarded partly by epidemics in the 1940's and earlier 1950's. In general, the crop sector has been able to meet the increasing demands for food and fiber in Mexico. The livestock sector has not satisfied the increases in demand and prices of livestock products have been rising in recent years.

The agricultural sector has also made important contributions to the general development of the Mexican economy through its increases in exports, which have enabled the country to obtain needed foreign exchange, as well as by substitution which has saved foreign exchange and permitted its use in the expansion of industrial activities.

A definite conclusion was not obtained as to whether the agricultural sector was a net supplier to or a net receiver of capital from the other sectors of the economy. While the government in general was a net supplier of capital to the agricultural sector, the banking and the price system acted as mechanisms to transfer savings from agriculture to the other sectors. Labor was transferred to the other sectors while agricultural production increased continuously. This transfer of labor helped to keep the wages low and stimulated production in the industrial sector.

Progress in the agricultural sector has enabled it to become an expanded market for new inputs supplied by the non-farm sectors. Land, which was not being used, or was used extensively under the hacienda system, has been used more

intensively under the new agrarian structure. Mechanization and increased use of capital have been significant in the private farm sector, especially on farms with more than five hectares.

The irrigation programs have extended agricultural production to additional areas of land and, at the same time, have increased production on lands that were already under cultivation.

The uses of fertilizers and improved seeds have increased but their use has been limited by their high cost. It is to be expected that, as their production is expanded, cost will be reduced and it will become profitable for additional farmers to use them. Their use has increased the yields of wheat, cotton, corn, and other agricultural commodities.

The government credit programs, through the Banco Nacional de Credito Agricola (BNCA) and the Banco Nacional de Credito Ejidal (BNCE), have permitted the purchase of larger quantities of inputs. On several occasions the BNCE has acted as a source of subsidy for the ejidatarios; thus it served as a social as well as an economic function.

The government activities associated with the banks, first Compania Exportadora Importadora, S.A. (CIEMSA) and recently Corporacion Nacional de Subsistencias Populares (CONASUPO), helped to increase production at low prices to meet the expanding demands of the rapidly increasing urban population; at the same time income subsidies were provided

for the producers in the most depressed areas of Mexican agriculture. Almacenes Nacionales de Deposito, S.A. (ANDSA) has provided for the storage of agricultural commodities. Crop losses have been reduced as ANDSA expanded its activities. The land reform program affected the incentives. The ejidatarios were working for themselves. In the private property system land was less of a status symbol, and more of a means of production. The old latifundias were transformed into modern agricultural enterprises, as new inputs were made available to combine with the parts of the old haciendas that owners chose to keep within the limits of the agrarian reform laws. The new political situation provided incentives for the government to invest in irrigation, roads, education, and other parts of the rural infrastructure. A rough estimate of the contribution to the agricultural GNP originating from general improvements in agricultural productivity was given in Table 83. The results indicate that most of the improvements in productivity have occurred since 1940.

The production activities of the ejidos and the production activities of the private land holdings are not subject to direct comparison on the basis of economic criteria alone. These two systems have not operated under the same conditions and they were established to fulfill different needs and objectives. It serves no purpose to compare the generally modern large farms, with more than five hectares, that were more highly capitalized, used hybrid seeds, fertilizers and

pesticides, and received more of the benefits of irrigation, with the ejidos that had less capital, a small parcel of land per worker, the least productive soil, and an abundant labor supply--in some cases, slash and burn agricultural practices were followed. Despite these conditions, the ejidos have contributed significantly to the agricultural production, have reduced the land hunger of the ejidatarios and have helped them and their families to establish a claim to at least subsistence output. The alternatives probably would have been to join the army of the unemployed in the crowded cities or to resort to armed revolution to overthrow the system that denied them an opportunity to work. The agrarian reform permitted, in both the ejido and the private sectors, the more intensive use of land and labor without an excessive increase in costs. Neither factor was used most productively under the hacienda system. The ejidos, in 1960, had more land, capital and output per worker than did the small private farms with less than five hectares but much less land, capital and output per worker than did the large privately held farms. (See Tables 130 and 131 for summaries of input-output ratios and factor proportions.) The capital-output ratio was lower on the ejidos than on either size group of the privately owned farms.

The income and standard of living of the Mexican agricultural population have improved in the 20th century, but the average levels are still low, and people exist in pockets of

deep poverty. The average income differences are still quite large between the urban and rural sectors, between the non-salaried sector and the salaried sector, and between the farms with irrigation and those without irrigation. Social mobility, life expectancy and social security improved.

From 1940 to 1968, the average annual rate of growth in GNP at 1950 prices was 6.5 percent, while population in the same period increased at a rate of 3.3 percent. In terms of personal income distribution, it appears from some data that there has been an upward shift in the percentages of families in the middle and upper income levels (See Table 137). Other studies show a small reduction in the share of total income that were received by both upper and lower extremes in family income levels (See Tables 135 and 136). The regional inequality of income distribution in the agricultural sector has been affected by the Revolutionary War, and the development process in general, as well as by specific government programs.

The ejidal sector has provided a livelihood for large masses of Mexicans who did not have an opportunity for productive employment in the non-agricultural sectors. The agrarian reform program provided the needed alternative to massive unemployment, while the population was increasing rapidly as birth rates increased and death rates, due to health improvements, fell rapidly. But the agrarian reform has not, and can not in the future, fulfill its promise of

giving the land to those who work it. Despite a substantial increase in the number of landowners, the number of peons is greater than the number of ejidatarios. The high rates of population growth, the inability of the non-agricultural sector to absorb workers at a faster rate and the scarcity of land subject to expropriation under the present agrarian laws make it impossible to fulfill this promise.

With many imperfections and far from being a democratic society, Mexico in the 20th century, after more than two decades of political instability (1910-1934), has achieved the stability and a strong sense of national purpose needed in political affairs to achieve economic development. Peasants were freed from peonage, and the traditional privileged interests--church, army, landlords, and foreign capitalists--lost their economic and political control. Military revolts were ended. Peaceful elections came into being, and basic freedoms were enlarged. Peasant participation in public matters has been initiated through participation in the election of the ejidos' officials and formal discussions of ejidal matters. The peasants, through the Revolution, gained consciousness of their liberty and their civil rights. At the national level, despite the fact that most of its leaders are from non-agricultural sectors, the interests of the ejidatarios are represented in the Confederacion Nacional Campesina (CNC), where they have some voice in the solution of the problems of Mexico. As the educational level of the

Mexican agrarian masses continue to be improved, their participation in public matters is expected to be extended.

The ejido is an institution that had its roots in pre-colonial days of Indian Mexico; it is in some aspects, an institution with feudal characteristics. The ejido, new in some respects yet quite old in others, was the main institution established by the agrarian reform program as a replacement of the hacienda-latifundist system of Mexico. It has fulfilled this mission.¹

The ejidos were seen by many persons as the seed of future cooperatives; in this respect it has fulfilled expectations only in the collective ejidos. The ejidos have kept land out of the free market, and thus have reduced land speculation and prevented the reappearance of the hacienda system. It has promoted the cultivation of the land by its direct beneficiaries, and has made it impossible for foreigners to own Mexican land. The election of ejidal officials has strengthened the democratic spirit among the peasants. But the ejidos are affected by several problems; among them are the inflexibilities and the smallness of the ejidal parcel. In many cases the ejidal plot is no more than one-half to one hectare, which is too small to provide full

¹A few latifundia are reported to be in existence disguised under several names. This, as well as the illegal renting of ejidal lands, is called "neolatifundism," by some Mexican writers.

employment for the family labor. This is a difficult problem to solve, since it is related to the overabundance and increasing supply of labor in relation to land in the ejidal sector. Several proposals have been made, such as permitting land transactions--legally, ejidal lands cannot be sold, rented or mortgaged. Others have proposed that ejidal parcels be integrated by the State into units of a larger size by reducing the number of peasants. But these approaches all take for granted that there is an alternative job to be provided to the excess of peasants which is not the case at present nor is it likely to be the case in the foreseeable future, as long as the present high rate of population growth continues.

Another obstacle is that, in several cases, the ejidal unit sometimes consists of several scattered small plots. This condition contributes to an uneconomic use of the cultivation efforts. The solution is consolidation.

Another criticism of the ejido is the lack of freedom of the individual due to excessive intervention of the State. For example, the Government rather than the private credit system furnishes nearly all the credit. This is related, among other things, to the low educational level of the peasants. It is a matter of time, experience and education. This cannot be accomplished overnight. There are still groups of Mexicans that do not speak Spanish. There is a scarcity of Government resources in relation to their alternative uses.

There is an acute need for the development of a national cadastral system to reduce the uncertainties of property and tenancy that arise from unclear titles and boundaries.

Despite its shortcomings, the ejido under the socio-political situation of Mexico, appears to be an institution that will be continued for the foreseeable future. It has fulfilled its main purposes--abolishing the hacienda system and providing a place where labor can be kept until it is demanded in other activities. Fulfillment of these social functions has created the level of stability needed to undertake the development activities of the country. It has also contributed significantly to the production process of the agricultural sector. Its contribution would have been greater if it had not been for external constraints on credit and the complementary modern inputs.

A problem which remains unsolved is the one of the ejidatarios without land, who had ejidal latent rights ("derechos a salvo"). This was a pragmatic solution to the overabundance of labor and the scarcity of land available for distribution. It is obvious by now that in the present circumstances it is impossible to distribute land to this army of landless hopefuls; but if the Government were to admit this impossibility, it would create political upheavals. The solution must be found in the form of new job sources outside the agricultural sector.

Mexico's agricultural problem today is basically a problem of overabundance of labor on the farms. At the beginning of the century, an obstacle to the development of the country was the hacienda system; on balance the contributions of the ejido and the agrarian reform have been positive. Today, the problem is different. The social problems have always been and probably will always be a phenomena in constant evolution. The solution to present problems will have to come from outside the agricultural sector. Once the problem of absorbing additional population into the non-agricultural sectors of the nation is solved, the situation will be different. But in the meantime, the ejido has to continue fulfilling its social functions.

Mexican agriculture has contributed to the economic growth of Mexico, but a new emphasis in the social needs of the Mexican peasants is required. This was recognized by the present President of Mexico, Luis Echevarria Alvarez, "The reconquest of the land was a profound cause of the Revolution and the origin of present-day Mexico. However, thousands of peasants still live under harsh conditions... I will not rest one day in the next six years in the task of promoting the improvement of the situation of the peasants" [Echevarria, 1971, p. 31-A].

For several reasons, the Mexican experience in agrarian reform is not directly transferable to the other Latin American countries. First, very few Latin American countries

(Guatemala, Bolivia, and Peru are exceptions) have as large a percentage of Indian population as Mexico. Second, the Mexican ejido is mainly an institution which had its origin in the Aztecs' land tenure institutions, that is, it is not a part of the tradition of the other Latin American countries. Third, the socio-economics and political conditions of Latin America today are not those of Mexico in 1910. And finally, associated with the previous reason, while the Mexican Revolution was characterized by its ideological nationalism, it was not influenced to any significant extent by foreign ideas. Today, the facility of communications and the cold war exert foreign influences of one kind or another in the ideas of any political movement that plans to conduct an agrarian reform on any significant scale. In this sense, it can be said that the Mexican Revolution was free from foreign interference and threats.

Despite the differences listed above, the Mexican agrarian reform has provided some lessons for Latin America.

(a) The complicated and sometimes contradictory legal machinery should be considered as an obstacle in achieving the objectives of increasing the agricultural production--it fails to provide the security needed for the investment process.

(b) The legal appeals ("amparos") given to the latifundist class in the beginning of the agrarian reform program were deterrents to implementation of the program. The

appeals should be reduced to a minimum and the legal process carried out swiftly in order to avoid uncertainties in both classes, those from whom the land is to be taken and the beneficiaries of agrarian reform.

(c) The initial approach, in the Mexican agrarian reform of giving attention only to the distributive aspects of the program, is insufficient.

Land distributed to landless persons may lead to a static and inefficient economy. New and improved inputs are needed to increase production. Even then development is not immediate and automatic; time and education are needed. Also, the Mexican policy, that followed the initial one, of placing emphasis only on agricultural production and ignoring to a great extent the social aspects is likely to create social tensions and upheavals in rural areas.

(d) The amount of resources needed by the Government in carrying out the social and economic aspects of the agrarian reform caused such a drain that, if in reality agrarian reform is to be carried to a significant level, compensation for expropriation of land is not feasible. If the political situation is strongly in favor of it, this can be carried out with minimum opposition from the latifundists. There was neither significant compensation nor organized opposition from the latifundist class in Mexico.

(e) The physical and historical constraints of each country will be important factors in determining appropriate

characteristics of its agrarian reform. The hacienda and the ejido predecessors were determinant factors in formulating the Mexican agrarian reform. But thought should be given to the idea of change in the future and not establishing exploitation units which later on may be a barrier to development.

(f) The agrarian reform, through its redistributive process and rearrangement of the political forces, could create the conditions that would bring pressure for agricultural development expenditures by the government as well as for political stability.

(g) The agrarian reform needs to create an alternative means for the rural masses to support themselves until job opportunities are available in the non-agricultural sectors. The ejidal system provided this alternative in the Mexican agrarian reform; otherwise there would have been a substantial increase in the jobless population and a politically explosive situation in the cities.

The Cuban experience was similar in some respects and different in others from the Mexican experience. It was similar in that it created an alternative for the jobless rural masses, and different in that its alternatives were determined by the military needs of the Cuban Revolution to provide for its own defense.

In any case, the influence of the political process will be decisive in the agrarian reforms of the Latin American

countries. The political forces will determine the final form and content of each agrarian reform. The Mexican revolutionary process, started in 1910, determined the present Mexican agrarian structure. It was an autochthonous process of Mexico, with specific context in time and space; consequently, it is not likely to be repeated nor would it necessarily be appropriate in other countries.

APPENDIX

Table 173. Results of Regressing Growth (Exponential)
Equation of Logarithmic Form for Main Crops,
Mexico, 1935-64^a

Item	Coefficients		R ²
	A ^b	B ^c	
<u>Corn</u>			
1935-40	7.782 (0.072)	0.0230 (0.0184)	0.28
1941-58	7.777 (0.059)	0.0393 (0.0036)	0.88
1959-64	7.352 (0.532)	0.0530 (0.0193)	0.65
1935-64	7.755 (0.030)	0.0393 (0.0017)	0.95
<u>Beans</u>			
1935-40	4.915 (0.162)	0.0188 (0.0416)	0.05
1941-58	4.463 (0.152)	0.0740 (0.0093)	0.80
1959-64	4.158 (0.625)	0.0843 (0.0227)	0.78
1935-64	4.654 (0.072)	0.0646 (0.0040)	0.95
<u>Wheat</u>			
1935-40	5.837 (0.103)	0.0430 (0.0265)	0.40
1941-58	5.188 (0.160)	0.0765 (0.0098)	0.79
1959-64	4.253 (0.513)	0.1110 (0.0186)	0.90
1935-64	5.555 (0.089)	0.0599 (0.0050)	0.84
<u>Cotton</u>			
1935-40	4.365 (0.093)	-0.0298 (0.0238)	0.28
1941-58	3.331 (0.163)	0.1258 (0.0100)	0.91

Table 173. Continued.

Item	A ^b	B ^c	R ²
<u>Cotton</u>			
1959-64	4.237 (0.358)	0.0702 (0.0130)	0.88
1935-64	3.882 (0.098)	0.0886 (0.0055)	0.90
<u>Cane</u>			
1935-40	8.173 (0.059)	0.0519 (0.0151)	0.75
1941-58	8.300 (0.067)	0.0553 (0.0041)	0.92
1959-64	8.539 (0.181)	0.0503 (0.0066)	0.94
1935-64	8.174 (0.031)	0.0630 (0.0018)	0.98
<u>Coffee</u>			
1935-40	4.078 (0.077)	-0.0131 (0.0196)	0.10
1941-58	3.521 (0.075)	0.0452 (0.0046)	0.86
1959-64	2.920 (0.464)	0.0702 (0.0168)	0.81
1935-64	3.745 (0.058)	0.0365 (0.0033)	0.82

^aEquation used $y = c(1+r)^x$ which in logarithmic form became $\log y = \log C + \log (1+r)X$

where y = output

c = output base year

r = rate of growth

x = year

^bA = $\log C$; standard errors are given in parentheses.

^cB = $\log (1+r)$; standard errors are given in parentheses.
Source: Computed from data in Tables 15, 29 and 56.

Table 174. Results of Regressing Growth (Exponential)
Equation of Logarithmic Forms for Main Crops,
Mexico, 1959-70^a

Crops	Coefficients		R ²
	A ^b	B ^c	
Beans	6.262 (0.068)	0.0640 (0.0092)	0.83
Cane	9.736 (0.038)	0.0388 (0.0052)	0.85
Coffee	4.812 (0.044)	0.0381 (0.0059)	0.81
Corn	8.569 (0.075)	0.0416 (0.0059)	0.63
Cotton	6.158 (0.104)	-0.0058 (0.0141)	0.02
Henequen	5.061 (0.056)	-0.0222 (0.0077)	0.46
Oranges	6.520 (0.027)	0.0315 (0.0036)	0.88
Potatoes	5.548 (0.071)	0.0644 (0.0096)	0.82
Sorghum	4.861 (0.134)	0.2299 (0.0183)	0.94
Strawberries ^d	2.502 (0.326)	0.2116 (0.0406)	0.77
Tobacco	3.532 (0.109)	0.0416 (0.0148)	0.44
Tomatoes	5.787 (0.060)	0.0735 (0.0082)	0.89
Watermelons	4.751 (0.109)	0.1305 (0.0148)	0.89
Wheat	7.125 (0.067)	0.0470 (0.0666)	0.73

^aEquation used $y = c(1+r)^x$ which in logarithmic form becomes $\log y = \log c + \log (1+r)x$
where y = output; c = output base year;
 r = rate of growth; x = year.

^bA = log C ; standard errors are given in parentheses.

^cB = log (1+r); standard errors are given in parentheses.

^dBased on data for 1961-70.

Source: Computed from data in Table 54.

Table 175. Total Land Area, by Region and Type of Land Holding, Mexico, Census Years, 1930 to 1960

Region and Type of Holding	1930	1940	1950	1960
	-----1,000 hectares-----			
<u>Mexico</u>	131,595	128,749	145,517	169,084
Private				
> 5 ha.	122,361	98,669	105,260	123,259
≤ 5 ha.	889	1,157	1,363	1,328
Ejidos	8,345	28,993	38,894	44,497
<u>North</u>	70,923	67,280	70,440	80,153
Private				
> 5 ha.	67,175	54,071	53,853	61,476
≤ 5 ha.	92	162	165	112
Ejidos	3,657	13,048	16,421	18,566
<u>Gulf</u>	15,364	17,528	20,328	25,114
Private				
> 5 ha.	13,815	13,428	14,259	17,573
≤ 5 ha.	96	116	136	165
Ejidos	1,453	3,984	5,933	7,375
<u>North Pacific</u>	13,407	13,744	18,668	22,635
Private				
> 5 ha.	12,915	10,931	14,571	18,139
≤ 5 ha.	35	40	32	31
Ejidos	458	2,773	4,065	4,465
<u>South Pacific</u>	12,978	13,222	17,157	21,235
Private				
> 5 ha.	12,222	10,676	12,849	15,605
≤ 5 ha.	166	200	280	331
Ejidos	590	2,346	4,028	5,299
<u>Center</u>	18,923	16,975	18,924	19,947
Private				
> 5 ha.	16,235	9,563	9,728	10,466
≤ 5 ha.	501	640	749	689
Ejidos	2,187	6,772	8,447	8,792

Source: Censo Agrícola, Ganadero y Ejidal. Several years.

Table 176. Cropland, by Region and Type of Land Holding, Mexico, Census Years 1930 to 1960, and Value of Production in 1960

Region and Type of Holding	1930	1940	1950	1960	Value of Agric. Production 1960 ^a
	-----1,000 hectares-----				(mil. pesos)
<u>Mexico</u>	14,618	14,871	19,928	23,817	20,233
Private					
>5 ha.	11,788	6,752	9,858	12,219	11,703
≤5 ha.	889	1,074	1,280	1,269	1,309
Ejidos	1,940	7,045	8,791	10,329	7,221
<u>North</u>	2,985	3,560	4,667	5,932	5,756
Private					
>5 ha.	2,412	1,730	2,412	3,343	4,063
≤5 ha.	92	147	151	104	145
Ejidos	482	1,683	2,105	2,485	1,548
<u>Gulf</u>	2,890	2,565	3,413	4,256	3,217
Private					
>5 ha.	2,401	1,117	1,801	2,287	1,582
≤5 ha.	96	105	124	157	153
Ejidos	393	1,342	1,488	1,812	1,482
<u>North Pacific</u>	992	1,147	2,076	2,489	3,226
Private					
>5 ha.	816	512	1,247	1,365	2,069
≤5 ha.	35	39	30	29	57
Ejidos	71	596	799	1,095	1,100
<u>South Pacific</u>	2,472	2,173	3,591	4,590	2,899
Private					
>5 ha.	2,145	1,238	2,137	2,639	1,520
≤5 ha.	166	196	279	329	270
Ejidos	161	739	1,175	1,622	931
<u>Center</u>	5,349	5,427	6,181	6,549	5,313
Private					
>5 ha.	4,014	2,154	2,261	2,585	2,470
≤5 ha.	501	588	696	649	683
Ejidos	834	2,684	3,224	3,315	2,160

^aDoes not include livestock in towns.

Source: Censo Agrícola, Ganadero y Ejidal. Several years.

Table 177. Distribution of Farms between Crops and Livestock, by Region and Type of Land Holding, Mexico, 1960

Region and Type of Holding	Totala		Crops		Livestock		Crops as Percent of Total	
	Number	Hectares	Number	Hectares	Number	Hectares	Number	Hectares
<hr/>								
Mexico	1,147	129,950	1,017	76,708	101	50,336	89	59
Private								
>5 ha.	372	85,295	304	35,545	65	47,092	82	42
≤5 ha.	757	1,132	696	1,034	35	64	92	91
Ejidros	18	43,523	17	40,129	1	3,180	94	92
<hr/>								
North	148	63,434	123	30,596	22	32,272	83	48
Private								
>5 ha.	109	45,200	91	14,360	18	30,286	90	32
≤5 ha.	34	80	28	68	4	9	82	85
Ejidros	5	18,154	4	16,168	b	1,977	80	89
<hr/>								
Gulf	141	15,716	111	10,980	2	3,146	79	70
Private								
>5 ha.	73	8,473	51	4,005	1	3,019	70	47
≤5 ha.	65	125	57	106	b	14	88	85
Ejidros	3	7,118	3	6,869	b	113	100	96
<hr/>								
North Pacific	38	18,572	29	7,836	8	10,643	76	42
Private								
>5 ha.	27	14,151	20	4,265	6	9,844	74	30
≤5 ha.	10	25	8	20	2	4	80	80
Ejidros	1	4,396	1	3,551	b	795	100	81

Table 177. Continued.

Region and Type of Holding	Total ^a		Crops		Livestock		Crops as Percent of Total	
	Number	Hectares	Number	Hectares	Number	Hectares	Number	Hectares
-----1,000-----								
South Pacific	212	14,385	196	12,196	11	1,757	92	85
Private								
>5 ha.	45	8,867	39	6,796	6	1,659	89	77
≤5 ha.	165	315	155	298	5	10	94	95
Ejidos	2	5,203	2	5,102	b	88	100	98
Center	608	17,843	568	15,100	33	2,518	93	84
Private								
>5 ha.	117	8,604	103	6,119	13	2,284	88	71
≤5 ha.	484	587	458	543	19	27	93	93
Ejidos	7	8,652	7	8,438	b	207	100	98

^aCrops plus livestock farms do not add to total as these are small numbers of other types.

^bLess than 500.

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 178. Land Distribution, by Use and Type of Land Holding, Mexico, 1960

Region and Type of Holding	Number of Units	Total Area	Crops	Pastures	Forests	1,000 hectares		Uncultivated but Productive	Agriculturally Unproductive
<u>Mexico</u>	(1,000)								
Private > 5 ha.	1,365	169,084	23,817	79,092	43,678	11,193	11,304		
Private ≤ 5 ha.	447	123,259	12,219	59,443	35,643	7,243	8,712		
Ejidos	899	1,328	1,269	36	6	2	15		
	19	44,497	10,329	19,614	8,030	3,947	2,577		
<u>North</u>									
Private > 5 ha.	190	80,153	5,932	46,067	17,016	6,245	4,894		
Private ≤ 5 ha.	137	61,476	3,343	35,516	14,484	4,257	3,876		
Ejidos	48	112	104	5	-	-	2		
	5	18,566	2,485	10,545	2,532	1,987	1,016		
<u>Gulf</u>									
Private > 5 ha.	180	25,114	4,256	4,562	11,292	2,984	2,020		
Private ≤ 5 ha.	94	17,573	2,287	3,309	8,412	2,058	1,508		
Ejidos	83	165	157	5	1	-	3		
	3	7,375	1,812	1,248	2,879	926	510		
<u>North Pacific</u>									
Private > 5 ha.	45	22,635	2,489	14,146	4,176	532	1,292		
Private ≤ 5 ha.	32	18,139	1,365	12,142	3,562	246	826		
Ejidos	12	31	29	1	-	-	-		
	1	4,465	1,095	2,003	614	286	466		
<u>South Pacific</u>									
Private > 5 ha.	227	21,235	4,590	6,118	7,955	887	1,685		
Private ≤ 5 ha.	49	15,605	2,639	4,022	7,007	485	1,452		
Ejidos	176	331	329	2	-	-	-		
	3	5,299	1,622	2,094	947	402	232		
<u>Center</u>									
Private > 5 ha.	723	19,947	6,549	8,201	3,240	545	1,412		
Private ≤ 5 ha.	135	10,466	2,585	4,454	2,178	198	1,051		
Ejidos	581	689	649	23	5	2	10		
	7	8,792	3,341	3,723	1,057	346	352		

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 179. Distribution of Land Among Principal Crops,
by Region and Type of Land Holding, Mexico,
1960

Region and Type of Holding	Corn	Beans	Sugarcane	Wheat	Cotton	Coffee	Total
-----1,000 hectares-----							
<u>Mexico</u>	12,834	841	342	1,170	1,032	634	16,902
Private							
>5 ha.	4,300	579	75	612	593	357	6,516
≤5 ha.	780	23	11	29	4	62	909
Ejidos	7,804	239	255	529	435	215	9,477
<u>North</u>	2,667	436	43	384	692	26	4,248
Private							
>5 ha.	1,167	361	12	175	421	13	2,149
≤5 ha.	46	2	1	5	3	2	59
Ejidos	1,455	73	30	205	268	11	2,042
<u>Gulf</u>	2,242	93	153	a	a	173	2,661
Private							
>5 ha.	498	52	28	a	a	80	658
≤5 ha.	47	3	4	a	a	23	77
Ejidos	1,697	38	121	-	a	70	1,926
<u>N. Pacific</u>	751	77	38	446	330	16	1,658
Private							
>5 ha.	186	29	15	290	167	12	699
≤5 ha.	8	1	a	5	1	a	15
Ejidos	558	48	23	152	162	4	947
<u>S. Pacific</u>	2,453	78	29	16	6	376	2,958
Private							
>5 ha.	890	49	6	7	5	229	1,186
≤5 ha.	241	7	3	8	a	21	280
Ejidos	1,321	23	21	a	1	125	1,491
<u>Center</u>	4,771	156	78	323	4	44	5,376
Private							
>5 ha.	1,559	89	14	140	a	23	1,825
≤5 ha.	438	10	3	11	a	16	478
Ejidos	2,774	57	61	173	4	4	3,073

^aLess than 500.

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 180. Yield Per Hectare, Principal Crops, by Region and Type of Land Holding, Mexico, 1950

Region and Type of Holding	Beans	Coffee ^a	kilogram per hectare			Sugarcane (1st Crop)	Wheat
			Common Corn (Alone)	Cotton			
<u>Mexico</u>	396	1.41	812	956		58,895	964
Private	427	1.29	855	998		68,526	1,094
Ejidos	352	1.73	741	887		52,118	817
<u>North</u>	372	1.03	701	966		55,142	876
Private	411	0.97	775	1,088		67,183	924
Ejidos	341	1.30	604	893		52,239	826
<u>Gulf</u>	617	1.39	1,025	969		62,875	648
Private	775	1.05	1,143	1,225		77,845	732
Ejidos	530	1.92	951	610		48,527	556
<u>North Pacific</u>	574	1.56	1,041	929		52,720	1,210
Private	589	0.79	1,030	976		59,745	1,391
Ejidos	557	1.77	1,047	888		47,760	953
<u>South Pacific</u>	362	1.55	820	792		50,272	806
Private	302	1.53	849	829		51,133	812
Ejidos	369	1.62	814	570		44,415	472
<u>Center</u>	333	1.12	786	1,616		64,427	850
Private	410	1.08	846	900		62,218	965
Ejidos	240	1.77	700	1,947		67,548	770

^aKilograms per plant in productionSource: III Censo Agrícola, Canadero y Ejidal, 1950.

Table 161. Yield of Main Crops by Region and Type of Land Holding, Mexico, 1960

Region and Type of Holding	Cotton	Sugarcane (1st crop)	Sugarcane (Ratoon) (Alone)	Beans (Alone)	Common Corn		Common Corn (Alone)	Hybrid Corn	Wheat
					(Interplanted)	(kilogram per hectare)			
Mexico	1,379	46,848	39,139	565	636		841	1,471	1,341
Private >5 ha.	1,378	44,879	40,817	559	623		839	1,559	1,522
Private ≤5 ha.	1,473	48,271	-	830	687		846	1,822	1,137
Ejidors	1,380	48,630	37,401	554	646		842	1,380	1,066
North	1,264	42,711	39,656	490	552		720	1,474	1,208
Private >5 ha.	1,287	42,323	40,595	499	599		749	1,758	1,322
Private ≤5 ha.	1,302	38,915	-	707	656		746	-	1,438
Ejidors	1,223	43,248	38,593	477	521		686	1,206	1,014
Gulf	815	39,678	34,617	848	754		959	1,378	517
Private >5 ha.	815	42,303	37,663	864	705		969	1,513	555
Private ≤5 ha.	-	40,751	-	1,029	-		971	2,000	865
Ejidors	814	34,680	31,442	826	779		951	1,294	469
N. Pacific	1,549	50,110	40,628	825	812		1,208	1,794	1,617
Private >5 ha.	1,593	52,782	43,231	957	788		1,157	1,891	1,804
Private ≤5 ha.	1,713	42,525	-	1,069	1,100		1,417	2,999	1,331
Ejidors	1,641	48,288	38,600	743	822		1,238	1,753	1,119
S. Pacific	1,466	42,456	37,317	479	723		832	1,168	807
Private >5 ha.	1,486	41,811	37,440	411	702		839	1,297	800
Private ≤5 ha.	963	38,038	-	953	1,025		723	1,333	814
Ejidors	1,399	45,464	37,039	496	740		885	939	857
Center	1,747	62,242	51,814	528	615		840	1,445	1,164
Private >5 ha.	1,704	55,708	53,112	534	598		828	1,491	1,275
Private ≤5 ha.	1,400	66,055	-	725	683		898	1,851	1,127
Ejidors	1,764	63,549	50,814	500	632		827	1,384	1,072

Source: IV Censo Agricola, Ganadero y Ejidal, 1960.

Table 182. Capital, Cropland, Labor, and Output, by Region and Type of Land Holding, Workers, and Output in Agriculture, Mexico, 1960

Region and Type of Holding	Capital ^a (mil. pesos)	Cropland (1,000 ha.)	Workers ^b (1,000)	Output ^c (mil. pesos)
<u>Mexico</u>	24,767	23,817	5,579	20,233
Private >5 ha.	15,334	12,219	1,962	11,703
Private ≤5 ha.	1,875	1,269	2,105	1,309
Ejidos	7,558	10,329	1,512	7,221
<u>North</u>	8,301	5,932	956	5,756
Private >5 ha.	5,585	3,343	557	4,063
Private ≤5 ha.	208	104	90	145
Ejidos	2,508	2,485	309	1,548
<u>Gulf</u>	3,569	4,256	731	3,217
Private >5 ha.	2,555	2,287	310	1,582
Private ≤5 ha.	113	157	198	153
Ejidos	901	1,812	223	1,482
<u>North Pacific</u>	3,847	2,489	328	3,226
Private >5 ha.	2,940	1,365	212	2,069
Private ≤5 ha.	79	29	26	57
Ejidos	828	1,095	90	1,100
<u>South Pacific</u>	2,066	4,590	930	2,721
Private >5 ha.	1,068	2,639	274	1,520
Private ≤5 ha.	364	329	434	270
Ejidos	634	1,622	222	931
<u>Center</u>	6,981	6,549	2,634	5,313
Private >5 ha.	3,186	2,585	611	2,470
Private ≤5 ha.	1,111	649	1,355	683
Ejidos	2,684	3,315	668	2,160

^aCapital includes buildings, structures, roads, irrigation facilities, machinery, implements and livestock, excluding livestock in towns.

^bWorkers on private farms of more than five hectares include only those persons over 15 years old; workers on ejidos include only those who received more than half of their income from ejidal sources.

^cOutput includes gross value of crops, livestock and forestry, excluding livestock in towns.

Source: IV Censo Agricola, Ganadero y Ejidal, 1960.

Table 183. Value of Land and Capital on Farms, by Type of Land Holding, Mexico, 1940, 1950 and 1960

Year and Type of Holding	Total Land	Fixed Capital ^a	Machinery	Imple- ments	Livestock	
-----million pesos in current prices-----						
<u>1940</u>						
Total	4,387	2,781	323	107	36	1,140
Private						
>5 ha.	2,141	1,640	150	50	15	286
≤5 ha.	748	143	n.a.	6	n.a.	599
Ejidos	1,498	998	173	51	21	255
<u>1950</u>						
Total	26,998	20,684	1,106	1,067	178	3,963
Private						
>5 ha.	16,090	12,562	785	719	64	1,960
≤5 ha.	1,293	783	n.a.	47	n.a.	463
Ejidos	9,615	7,339	321	301	114	1,540
<u>1960</u>						
Total	88,209	63,444	3,684	4,317	287	16,477
Private						
>5 ha.	55,401	40,068	2,564	2,893	71	9,805
≤5 ha.	3,749	1,875	384	93	79	1,318
Ejidos	29,059	21,501	736	1,331	137	5,354

^aIncludes buildings, structures, roads, railroads and irrigation facilities.

^bExcludes livestock in towns, reported to be 2,250 million pesos in 1950, 4,577 million pesos in 1960. Livestock in towns included in 1940.

n.a. Data not available.

Source: Censo Agrícola, Ganadero y Ejidal. Several years.

Table 184. Land Classification, by Use and Type of Land Holding, Mexico, 1940, 1950 and 1960

Use	Ejidat			Private			Total in Census		
	1940	1950	1960	1940	1950	1960	1940	1950	1960
	1,000 hectares								
Cropland	7,045	8,791	10,329	7,829	11,137	13,488	14,874	19,928	23,817
Irrigated	1,067	1,220	1,428	833	1,284	2,087	1,901	2,504	3,515
Humid	398	416	437	568	426	457	966	842	893
Temporal									
(Seasonal)	5,580	7,155	8,464	6,428	9,428	10,943	12,008	16,583	19,408
Pasture	10,660	16,530	19,614	47,525	50,849	59,478	58,185	67,379	79,092
Forest	6,873	8,801	8,030	31,785	30,035	35,649	38,658	38,836	43,679
Productive									
but Un-									
cultivated	1,696	1,718	3,947	7,208	6,059	7,245	8,905	7,777	11,192
Agriculturally									
Unproductive	2,648	3,055	2,577	8,311	8,542	8,727	10,979	11,597	11,304
Total	28,923	38,894	44,497	102,678	106,623	124,586	131,601	145,517	169,084

Source: IV Censo Agrícola, Ganadero y Ejidal, 1960.

Table 185. Rural Population by Regions, Mexico, Census Years, 1900-1960

Region	1900	1910	1921	1930	1940	1950	1960
-----1,000 persons-----							
Mexico	9,758	10,812	9,869	11,012	12,757	14,808	17,218
North	1,868	2,140	1,744	2,061	2,518	2,988	3,341
Gulf	1,215	1,273	1,275	1,424	1,661	1,947	2,356
North Pacific	588	649	607	666	854	1,050	1,242
South Pacific	1,436	1,687	1,650	1,905	2,253	2,590	3,165
Center	4,651	5,063	4,594	4,956	5,471	6,233	7,114

Source: Censo de Poblacion, Several years.

Table 186. Regional Agricultural Production per Rural Inhabitant, Mexico, 1899-1960

Region	1899	1907	1930	1940	1950	1960
-----Pesos in 1950 Values-----						
Mexico	125	128	178	243	405	533
North	79	83	174	313	604	632
Gulf	231	256	278	345	425	662
North Pacific	157	85	474	413	937	1,323
South Pacific	67	102	110	141	340	423
Center	129	128	137	194	242	351

Source: Reynolds, Clark W., The Mexican Economy (New Haven: Yale University Press, 1970), p. 98.

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BIOGRAPHICAL SKETCH

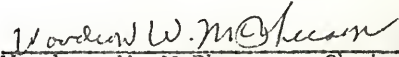
Juan Antonio Figueras was born in Havana, Cuba, March 9, 1938. He studied five years of law at the University of Havana. The years of 1955 through 1963 were spent in intense political activities.

In 1964, in exile, he renewed his studies and obtained a bachelor's degree in economics at the University of Miami in 1965. With a Ford Foundation Fellowship, he obtained the M.A. degree in economics and Latin American studies at Vanderbilt University (1965-66). During 1966-67 he worked as a research statistician at the Cuban Refugee Center, D.H.E.W., Miami, Florida.

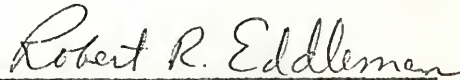
In the summer of 1967, Mr. Figueras entered graduate school at the University of Florida. After admission to the candidacy for the Ph.D. degree, majoring in food and resource economics (formerly, agricultural economics), he spent two years as Assistant Professor at Fresno State College (now California State University at Fresno). In the summer of 1971, he returned to the University of Florida to complete his dissertation. He has accepted an appointment, beginning December 1972, as Visiting Professor in agricultural economics at the Instituto Colombiano Agropecuario, in Bogota, Colombia, a program supported by the Ford Foundation.

Mr. Figueras is married to the former Vivian Pelaez, also of Cuba. They have four children, Vivian T., Wifredo, Juan E. (John-John) and Ayleen. Their ages range from 11 years old to 9 months old. Ayleen was born while this dissertation was being written.

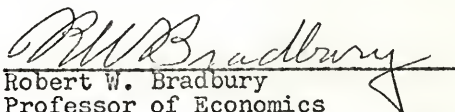
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Woodrow W. McPherson, Chairman
Graduate Research Professor of
Food and Resource Economics

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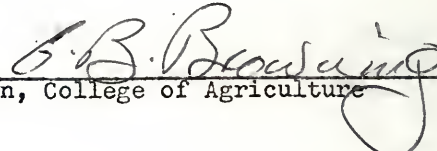

Robert R. Eddleman
Associate Professor of Food
and Resource Economics

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Robert W. Bradbury
Professor of Economics

This dissertation was submitted to the Dean of the College of Agriculture and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December, 1972


Dean, College of Agriculture

Dean, Graduate School

UNIVERSITY OF FLORIDA



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